



**Australian Government**

# **NWP07 Water Training Package**

**Release: 2.0**

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## Modification History

### Version modification history

The version details of this endorsed Training Package are in the table below. The latest information is at the top of the table.

Version	Release date	Comments
2	23 December 2010	<p>NWP10107 Certificate I in Water Sustainability is updated to NWP10110 Certificate I in Water Sustainability.</p> <p>Review of the Certificate I in Water Sustainability resulting in minor changes to requirements for assessment appropriate for delivery in schools. New versions of core and elective units: NWP101B Investigate sustainable water cycle management, NWP102B Design a basic water system model, NWP103B Demonstrate care and safe practices, NWP104B Sample and test water sources and quality and NWP105B Draw and use simple maps, plans and drawings.</p> <p>Unless specified, following changes apply only to elective units.</p> <p>Two new units have been developed for water meter installation in the Certificate III in Water Operations: NWP302A Install meters for non-potable, non-urban water supplies, and NWP304A Maintain meters for non-potable, non-urban water supplies.</p> <p>NWP325B Conduct and report on dam safety inspection and basic monitoring replaced by three new units for dam safety monitoring in the Certificate III in Water Operations; NWP326A Conduct and report dam safety instrumentation monitoring, NWP327A Inspect and report on concrete dam safety and NWP328A Inspect and report on embankment dams safety.</p> <p>The units NWP334B, NWP335B, NWP336B and NWP337B have been combined in a new unit NWP303A Monitor and control maintenance of water and wastewater system assets.</p> <p>Certificate III in Water Operations includes two updated versions of imported core unit of competency: BSBWOR301A Organise personal work priorities and development, and BSBOHS303B Contribute to OHS hazard identification and risk assessment.</p> <p>New unit for hydrography in the Certificate IV in Water Operations:</p>

Version	Release date	Comments
		<p>NWP420A Install, operate and maintain hydrologic instruments and equipment</p> <p>NWP438A Measure and process hydrometric stream discharge data in flood conditions replaced by NWP421A</p> <p>Collect, measure and process hydrologic stream discharge gauging</p> <p>NWP437A Analyse data and produce hydrometric reports incorporated into NWP421A.</p> <p>NWP426B Coordinate and monitor the operation of potable water systems replaced by NWP403A Investigate and plan the optimisation of potable water distribution systems.</p> <p>NWP410B Coordinate and monitor asset constructions and maintenance has an updated version: NWP410C Coordinate and monitor asset construction and maintenance.</p> <p>Replacement of two large units in water and wastewater treatment in Certificate IV in Water Operations:</p> <p>NWP435B Coordinate and monitor the optimisation of water treatment processes</p> <p>NWP436B Coordinate and monitor the optimisation of wastewater treatment processes</p> <p>with smaller units to allow greater flexibility:</p> <p>NWP404A Apply principles of chemistry to water systems and processes</p> <p>NWP406A Investigate and plan the optimisation of granular media filtration processes</p> <p>NWP407A Investigate and plan the optimisation of dissolved air flotation processes</p> <p>NWP408A Investigate and plan the optimisation of sedimentation and clarification processes</p> <p>NWP409A Investigate and plan to optimise the operation of chemical addition processes</p> <p>NWP411A Select treatment requirements for waterborne microorganisms</p> <p>NWP412A Investigate and plan the optimisation of activated sludge processes</p> <p>NWP413A Investigate and plan the optimisation of anaerobic treatment processes</p> <p>NWP414A Select strategies to control microbial impact on</p>



Version	Release date	Comments
		<p>wastewater treatment processes</p> <p>New elective unit: NWP432A Contribute to the continuous improvement of quality systems.</p> <p>Additional imported units have been added to the Certificate IV in Water Operations:</p> <p>RTD3507A Undertake sampling and testing of water</p> <p>MEM30027A Prepare basic programs for programmable logic controllers</p> <p>MSACMT461A Facilitate SCADA systems in a manufacturing team or work area</p> <p>NWP219A Work safely in confined spaces has been included as an elective at Certificate IV in Water Operations.</p> <p>Units for hydrography have been added to the Diploma of Water Operations:</p> <p>NWP504A Collect and manage hydrometric station survey data</p> <p>NWP508A Apply principles of hydraulics to pipe and channel flows</p> <p>NWP509A Collect, verify and report hydrometric time series data</p> <p>NWP510A Develop and maintain ratings</p> <p>Imported units have been updated to new codes in reviewed parent Training Package. These include core units in Certificate III and Certificate IV.</p>
1.1	July 2010	ISC Upgrade to incorporate wording for flexible packaging policy into 20 High Use qualifications. NWP20107 and NWP30107 slight changes to cover accredited courses as source for imported electives.
1	12 March 2008	<p>NWP10101 has been replaced by NWP10107 Certificate I in Water Sustainability designed to be delivered in schools.</p> <p>A new qualification, NWP70107 Vocational Graduate Certificate in Water Industry Leadership has been added.</p> <p>The requirement in NWP01 that certificate qualifications had prerequisites of the preceding qualification has been removed.</p>
1	20 May 2002	Primary release, based on revision of UTW98 Water

Version	Release date	Comments
		Industry Training Package.

## Preliminary information

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#### Important note to users

Training Packages are not static documents; they are amended periodically to reflect the latest industry practices and are version controlled. It is essential that the latest version is always used.

#### Check the version number before commencing training or assessment

This Training Package is Version 2.0. Check whether this is the latest version by going to the National Training Information Service ([www.ntis.gov.au](http://www.ntis.gov.au)) and locating information about the Training Package. Alternatively, contact Government Skills Australia ([www.governmentskills.com.au](http://www.governmentskills.com.au)) to confirm the latest version number.

#### Explanation of version number conventions

The primary release Training Package is Version 1. When changes are made to a Training Package, sometimes the version number is changed and sometimes it is not, depending on the extent of the change. When a Training Package is reviewed it is considered to be a new Training Package for the purposes of version control, and is Version 1. Do not confuse the version number with the Training Package's national code (which remains the same during its period of endorsement).

#### Version modification history

The version details of this endorsed Training Package are in the table below. The latest information is at the top of the table.

Version	Release date	Comments
2	23 December 2010	<p>NWP10107 Certificate I in Water Sustainability is updated to NWP10110 Certificate I in Water Sustainability.</p> <p>Review of the Certificate I in Water Sustainability resulting in minor changes to requirements for assessment appropriate for delivery in schools. New versions of core and elective units: NWP101B Investigate sustainable water cycle management, NWP102B Design a basic water system model, NWP103B Demonstrate care and safe practices, NWP104B Sample and test water sources and quality and NWP105B Draw and use simple maps, plans and drawings.</p> <p>Unless specified, following changes apply only to elective units.</p> <p>Two new units have been developed for water meter installation in the Certificate III in Water Operations: NWP302A Install meters for non-potable, non-urban water supplies, and NWP304A Maintain meters for non-potable,</p>

Version	Release date	Comments
		<p>non-urban water supplies.</p> <p>NWP325B Conduct and report on dam safety inspection and basic monitoring replaced by three new units for dam safety monitoring in the Certificate III in Water Operations; NWP326A Conduct and report dam safety instrumentation monitoring, NWP327A Inspect and report on concrete dam safety and NWP328A Inspect and report on embankment dams safety.</p> <p>The units NWP334B, NWP335B, NWP336B and NWP337B have been combined in a new unit NWP303A Monitor and control maintenance of water and wastewater system assets.</p> <p>Certificate III in Water Operations includes two updated versions of imported core unit of competency: BSBWOR301A Organise personal work priorities and development, and BSBOHS303B Contribute to OHS hazard identification and risk assessment.</p> <p>New unit for hydrography in the Certificate IV in Water Operations:</p> <p>NWP420A Install, operate and maintain hydrologic instruments and equipment</p> <p>NWP438A Measure and process hydrometric stream discharge data in flood conditions replaced by NWP421A Collect, measure and process hydrologic stream discharge gauging</p> <p>NWP437A Analyse data and produce hydrometric reports incorporated into NWP421A.</p> <p>NWP426B Coordinate and monitor the operation of potable water systems replaced by NWP403A Investigate and plan the optimisation of potable water distribution systems.</p> <p>NWP410B Coordinate and monitor asset constructions and maintenance has an updated version: NWP410C Coordinate and monitor asset construction and maintenance.</p> <p>Replacement of two large units in water and wastewater treatment in Certificate IV in Water Operations:</p> <p>NWP435B Coordinate and monitor the optimisation of water treatment processes</p> <p>NWP436B Coordinate and monitor the optimisation of wastewater treatment processes</p> <p>with smaller units to allow greater flexibility:</p>

Version	Release date	Comments
		<p>NWP404A Apply principles of chemistry to water systems and processes</p> <p>NWP406A Investigate and plan the optimisation of granular media filtration processes</p> <p>NWP407A Investigate and plan the optimisation of dissolved air flotation processes</p> <p>NWP408A Investigate and plan the optimisation of sedimentation and clarification processes</p> <p>NWP409A Investigate and plan to optimise the operation of chemical addition processes</p> <p>NWP411A Select treatment requirements for waterborne microorganisms</p> <p>NWP412A Investigate and plan the optimisation of activated sludge processes</p> <p>NWP413A Investigate and plan the optimisation of anaerobic treatment processes</p> <p>NWP414A Select strategies to control microbial impact on wastewater treatment processes</p> <p>New elective unit: NWP432A Contribute to the continuous improvement of quality systems.</p> <p>Additional imported units have been added to the Certificate IV in Water Operations:</p> <p>RTD3507A Undertake sampling and testing of water</p> <p>MEM30027A Prepare basic programs for programmable logic controllers</p> <p>MSACMT461A Facilitate SCADA systems in a manufacturing team or work area</p> <p>NWP219A Work safely in confined spaces has been included as an elective at Certificate IV in Water Operations.</p> <p>Units for hydrography have been added to the Diploma of Water Operations:</p> <p>NWP504A Collect and manage hydrometric station survey data</p> <p>NWP508A Apply principles of hydraulics to pipe and channel flows</p> <p>NWP509A Collect, verify and report hydrometric time series data</p>

Version	Release date	Comments
		NWP510A Develop and maintain ratings Imported units have been updated to new codes in reviewed parent Training Package. These include core units in Certificate III and Certificate IV.
1.1	July 2010	ISC Upgrade to incorporate wording for flexible packaging policy into 20 High Use qualifications. NWP20107 and NWP30107 slight changes to cover accredited courses as source for imported electives.
1	12 March 2008	NWP10101 has been replaced by NWP10107 Certificate I in Water Sustainability designed to be delivered in schools. A new qualification, NWP70107 Vocational Graduate Certificate in Water Industry Leadership has been added. The requirement in NWP01 that certificate qualifications had prerequisites of the preceding qualification has been removed.
1	20 May 2002	Primary release, based on revision of UTW98 Water Industry Training Package.

### Summary of AQF qualifications in NWP07 Water Training Package

Code	Title
NWP10110	Certificate I in Water Sustainability
NWP20107	Certificate II in Water Operations
NWP30107	Certificate III in Water Operations
NWP40107	Certificate IV in Water Operations
NWP50107	Diploma of Water Operations
NWP70107	Vocational Graduate Certificate in Water Industry Leadership

### Units of competency in NWP07 Water Training Package

Note: There are no prerequisites for any units of competency contained in the NWP07 qualifications.

#### Water industry units of competency

<b>Unit code</b>	<b>Unit title</b>
NWP101B	Investigate sustainable water cycle management
NWP102B	Design a basic water system model
NWP103B	Demonstrate care and safe practices
NWP104B	Sample and test water sources and quality
NWP105B	Draw and use simple maps, plans and drawings
NWP201B	Follow defined OHS procedures and regulatory requirements
NWP202B	Apply environmental and licensing procedures
NWP203B	Plan and organise personal work activities
NWP207A	Work effectively in the water industry
NWP208A	Perform basic wastewater tests
NWP209B	Use maps, plans, drawings and specifications
NWP210B	Perform basic water quality tests
NWP211B	Use computerised systems
NWP213B	Monitor and operate irrigation and domestic delivery systems
NWP215B	Install and replace basic volumetric metering equipment
NWP216B	Install basic metering equipment and flow control devices for irrigation systems
NWP218B	Perform and record sampling
NWP219A	Work safely in confined spaces
NWP220B	Collect and control drainage run-off
NWP221A	Operate basic flow control and regulating devices in water or wastewater treatment network systems
NWP222A	Operate basic flow control and regulating devices in irrigation systems
NWP223A	Install basic metering equipment, flow control and regulating devices

<b>Unit code</b>	<b>Unit title</b>
NWP226B	Prepare and restore work site
NWP227B	Control vegetation on a site
NWP229B	Repair minor structures
NWP230B	Maintain and repair irrigation channels and drains
NWP231B	Maintain and repair drainage assets
NWP232B	Operate water reticulation and distribution system
NWP233B	Construct and install water distribution assets
NWP234B	Locate, identify and protect utility services
NWP239B	Identify and apply water entitlements and delivery processes
NWP240B	Inspect and report catchment and surrounding areas
NWP241B	Inspect and maintain basic dams and water storages
NWP242B	Monitor and report water extraction
NWP243B	Operate bore fields and groundwater source systems
NWP244B	Maintain and repair bulkwater assets
NWP245B	Maintain tanks and water storage assets
NWP246B	Inspect and maintain public facilities
NWP247A	Maintain catchment and surrounding areas
NWP250B	Construct and install wastewater pipelines
NWP251B	Construct open earthen channels or drains
NWP252B	Construct and install irrigation delivery and stormwater drainage assets
NWP253B	Install and repair water services
NWP254B	Repair or insert water distribution assets
NWP255B	Maintain and repair wastewater collection assets



<b>Unit code</b>	<b>Unit title</b>
NWP256B	Monitor and report water distribution systems
NWP257B	Maintain and repair wastewater collection systems
NWP258B	Monitor and operate bulkwater transfer systems
NWP259B	Operate, monitor and maintain pump stations
NWP260A	Monitor and report water treatment processes
NWP261A	Operate and maintain water treatment plant and equipment
NWP262A	Monitor and report wastewater treatment processes
NWP263A	Operate and maintain wastewater treatment plant and equipment
NWP264B	Monitor, operate and report wastewater pre-treatment processes
NWP268B	Monitor, operate and report chlorine disinfection systems
NWP270B	Monitor, operate and report basic anaerobic processes
NWP271B	Monitor, operate and report sedimentation processes
NWP272B	Monitor, operate and report wastewater lagoon processes
NWP273A	Monitor, operate and report ultraviolet irradiation disinfection systems
NWP274A	Monitor, operate and report ozone treatment systems
NWP275A	Monitor, operate and report chlorine dioxide systems
NWP276A	Monitor, operate and report fluoridation systems
NWP277A	Work safely with liquefied chlorine gas
NWP278A	Perform blue green algae sampling
NWP300B	Provide and promote customer service
NWP301B	Implement, monitor and coordinate environmental procedures
NWP302A	Install meters for non-potable, non-urban water supplies
NWP303A	Monitor and control maintenance of water and wastewater system assets

<b>Unit code</b>	<b>Unit title</b>
NWP304A	Maintain meter for non-potable, non-urban water supplies
NWP305B	Monitor and conduct maintenance of complex flow-control and metering devices
NWP308B	Test and commission wastewater collection systems
NWP309B	Test and commission water distribution systems
NWP310B	Monitor and operate water distribution systems
NWP311B	Monitor and operate wastewater collection and transfer systems
NWP315B	Investigate and report breaches of water industry legislation
NWP316B	Monitor and schedule water deliveries
NWP317B	Control water quality in distribution systems
NWP318A	Monitor and operate gated spillways
NWP319A	Monitor and control dam operations
NWP320B	Monitor and implement dam maintenance
NWP321B	Inspect and operate groundwater regulation
NWP322B	Inspect and operate surface water systems
NWP323B	Monitor and coordinate catchment operations
NWP324B	Inspect and report river regulation operations
NWP326A	Conduct and report dam safety instrumentation monitoring
NWP327A	Inspect and report on concrete dam safety
NWP328A	Inspect and report on embankment dam safety
NWP330B	Establish positions of underground utilities using locating devices
NWP331B	Inspect conduit and report on condition and features
NWP332B	Monitor, operate and control drainage operations
NWP333B	Monitor and control rural water distribution operations

<b>Unit code</b>	<b>Unit title</b>
NWP338B	Perform odour and infiltration investigations
NWP339B	Perform leak detection
NWP340A	Measure and process hydrometric stream discharge data using wading gaugings
NWP342A	Commission, decommission and monitor hydrometric sites, stations and facilities
NWP345B	Monitor, operate and control water treatment processes
NWP346B	Monitor, operate and control wastewater treatment processes
NWP347B	Monitor, operate and control coagulation and flocculation processes
NWP348B	Monitor, operate and control sedimentation and clarification processes
NWP349B	Monitor, operate and control incineration processes
NWP350B	Monitor, operate and control aerobic bioreactor processes
NWP351B	Monitor, operate and control activated sludge processes
NWP352B	Monitor, operate and control dissolved air flotation processes
NWP353B	Monitor, operate and control anaerobic bioreactor processes
NWP354B	Monitor, operate and control granular media filtration processes
NWP355B	Monitor, operate and control membrane filtration processes
NWP356B	Monitor, operate and control ion exchange processes
NWP357B	Monitor, operate and control reverse osmosis and nano filtration processes
NWP359B	Monitor, operate and control nutrient removal processes
NWP360B	Monitor, operate and control dewatering processes
NWP361B	Monitor, operate and control gas scrubber treatment processes
NWP362B	Monitor, operate and control reclaimed water irrigation

<b>Unit code</b>	<b>Unit title</b>
NWP363B	Monitor performance and control maintenance of treatment plant assets
NWP364B	Perform laboratory testing
NWP365A	Identify and confirm blue green algae outbreaks
NWP366A	Monitor, operate and control chloramination disinfection processes
NWP367A	Monitor, operate and control activated carbon adsorption processes
NWP368A	Respond to blue green algae incidents
NWP401B	Coordinate and monitor the application of environmental plans and procedures
NWP403A	Investigate and plan the optimisation of potable water distribution systems
NWP404A	Apply principles of chemistry to water systems and processes
NWP406A	Investigate and plan the optimisation of granular media filtration processes
NWP407A	Investigate and plan the optimisation of dissolved air flotation processes
NWP408A	Investigate and plan the optimisation of sedimentation and clarification processes
NWP409A	Investigate and plan to optimise the operation of chemical addition processes
NWP410C	Coordinate and monitor asset construction and maintenance
NWP411A	Select treatment requirements for waterborne microorganisms
NWP412A	Investigate and plan the optimisation of activated sludge processes
NWP413A	Investigate and plan the optimisation of anaerobic treatment processes
NWP414A	Select strategies to control microbial impact on wastewater treatment processes

<b>Unit code</b>	<b>Unit title</b>
NWP415B	Coordinate and monitor surface water systems
NWP416B	Coordinate and monitor water storage catchment activities
NWP417B	Coordinate and monitor groundwater system usage
NWP418B	Coordinate and monitor bulkwater system operations
NWP419B	Coordinate and monitor river system usage
NWP420A	Install, operate and maintain hydrologic instruments and equipment
NWP421A	Collect, measure and process hydrometric stream discharge gauging
NWP425B	Coordinate and monitor the operation of irrigation delivery systems
NWP427B	Coordinate and monitor the operation of drainage systems
NWP428B	Coordinate and monitor the operation of wastewater collection systems
NWP429B	Coordinate, implement and report trade waste monitoring procedures
NWP430A	Evaluate, implement and monitor standard low-risk trade waste discharge approvals
NWP431A	Investigate, rectify and report on trade waste incidents
NWP432A	Contribute to the continuous improvement of quality systems
NWP440A	Supervise conduit inspection and reporting
NWP504A	Collect and manage hydrometric station survey data
NWP505B	Implement and monitor environmental management policies, plans, procedures and programs
NWP508A	Apply principle of hydraulics to pipe and channel flow
NWP509A	Collect, verify and report hydrometric time series data
NWP510A	Develop and maintain ratings

<b>Unit code</b>	<b>Unit title</b>
NWP511B	Manage large dam safety surveillance
NWP512B	Implement and manage catchment management plan
NWP513B	Develop and review catchment management plan
NWP514B	Implement and manage groundwater management plan
NWP515B	Develop and review groundwater management plan
NWP516B	Implement and manage surface water management plan
NWP517B	Develop and review surface water management plan
NWP518B	Prepare and report on data related to flood mitigation
NWP519B	Develop and report flood mitigation
NWP520A	Contribute to hydrometric planning and water resource management
NWP525B	Implement and manage asset construction and maintenance
NWP526A	Evaluate, implement and monitor high-risk trade waste discharge approvals
NWP527B	Conduct commissioning and post-commissioning activities
NWP528B	Implement and manage trade waste management policies and plans
NWP529B	Develop and modify trade waste management policies and plans
NWP530B	Implement and manage the operation and maintenance of irrigation delivery systems
NWP531B	Develop and review irrigation system management plan
NWP532B	Implement and manage potable water system management plan
NWP533B	Develop and review potable water system management plan
NWP534B	Implement and manage drainage system management plan
NWP535B	Develop and review drainage system management plan
NWP536B	Implement and manage wastewater collection management plan

Unit code	Unit title
NWP537B	Develop and review wastewater collection management plan
NWP545B	Implement and manage water treatment processes monitoring program
NWP546B	Develop and review water treatment processes management plan
NWP547B	Implement and manage wastewater treatment processes monitoring program
NWP548B	Develop and review wastewater treatment management plan
NWP551A	Evaluate, implement and monitor high-risk trade waste discharge approvals
NWP701A	Contribute to the development of a complex water organisation
NWP702A	Apply water industry legislation, codes and standards
NWP703A	Lead water planning processes
NWP704A	Lead a project development
NWP705A	Provide leadership in hydrometric network planning and water resource management
NWP706A	Review and evaluate water and wastewater sustainability objectives
NWP707A	Analyse and review water treatment plant technology

### Imported units of competency

Unit code	Unit title
RIICCM205A	Carry out manual excavation
RIICCM210A	Install trench support
BSBLED101A	Plan skills development
BSBWOR204A	Use business technology
BSBITU201A	Produce simple word processed documents

<b>Unit code</b>	<b>Unit title</b>
BSBITU202A	Create and use spread sheets
BSBWOR301A	Organise personal work priorities and development
BSBWOR404A	Develop work priorities
BSBMGT402A	Implement operational plan
BSBMGT515A	Manage operational plan
BSBFIM501A	Manage budgets and financial plans
BSBOHS303B	Contribute to OHS hazard identification and risk assessment
BSBWOR301A	Organise personal work priorities and development
LGACOM405B	Implement and monitor the organisation's OHS policies, procedures and programs within the work group
LGAWORK404A	Manage a civil works project
LGAWORK405A	Plan and supervise roadworks
LGAWORK406A	Supervise concrete works
LGAWORK501A	Prepare preliminary design for operational works
LGAWORK502A	Prepare detailed works project documentation
LGAWORK503A	Undertake project investigation
CPPSIS4002A	Store and retrieve spatial data
CPPSIS5002A	Capture new spatial data
CPPSIS5010A	Collate and interpret spatial data
MEM30027A	Prepare basic programs for programmable logic controllers
MSACMT461A	Facilitate SCADA systems in a manufacturing team or work area
PSPPROC414A	Manage contracts
PSPPROC506A	Plan to manage contracts
PSPSOHS501A	Participate in the coordination and maintenance of a systematic approach to managing OHS



Unit code	Unit title
RTD3507A	Undertake sampling and testing of water

### Summary of mapping of units of competency

Summary Mapping of NWP07 Version 1.1 to NWP07 Version 2 Units of Competency					
N = Not Equivalent E = Equivalent					
Version 1.1 Code	Version 1.1 Title	N/E	Version 2 Code	Version 2 Title	Comments
NWP101A		E	NWP101B	Investigate sustainable water cycle management	Reviewed and updated
NWP102A		E	NWP102B	Design a basic water system model	Reviewed and updated
NWP103A		E	NWP103B	Demonstrate care and safe practices	Reviewed and updated
NWP104A		E	NWP104B	Sample and test water sources and quality	Reviewed and updated
NWP105A		E	NWP105B	Draw and use simple maps, plans and drawings	Reviewed and updated
			NWP302A	Install meters for non-potable, non-urban water supplies	New unit
			NWP304A	Maintain meters for non-potable, non-urban	New unit

### Summary Mapping of NWP07 Version 1.1 to NWP07 Version 2 Units of Competency

N = Not Equivalent E = Equivalent

Version 1.1 Code	Version 1.1 Title	N/E	Version 2 Code	Version 2 Title	Comments
				water supplies	
			NWP326A	Conduct and report dam safety instrumentation monitoring	New unit
			NWP327A	Inspect and report on concrete dam safety	New unit
			NWP328A	Inspect and report on embankment dams safety	New unit

<b>Summary Mapping of NWP07 Version 1.1 to NWP07 Version 2 Units of Competency</b>					
N = Not Equivalent E = Equivalent					
<b>Version 1.1 Code</b>	<b>Version 1.1 Title</b>	<b>N/E</b>	<b>Version 2 Code</b>	<b>Version 2 Title</b>	<b>Comments</b>
NWP334B		E	NWP303A	Monitor and control maintenance of water and wastewater system assets	New unit/ Multi-unit equivalence with the combination of NWP335B, NWP336B and NWP337B
NWP335B		E	NWP303A	Monitor and control maintenance of water and wastewater system assets	New unit/ Multi-unit equivalence with the combination of NWP334B, NWP336B and NWP337B
NWP336B		E	NWP303A	Monitor and control maintenance of water and wastewater system assets	New unit/ Multi-unit equivalence with the combination of NWP334B, NWP335B and NWP337B
NWP337B		E	NWP303A	Monitor and control maintenance of water and wastewater system assets	New unit/ Multi-unit equivalence with the combination of NWP334B, NWP335B and NWP336B
			NWP420A	Install, operate and maintain hydrologic instruments	New unit

<b>Summary Mapping of NWP07 Version 1.1 to NWP07 Version 2 Units of Competency</b>					
N = Not Equivalent E = Equivalent					
<b>Version 1.1 Code</b>	<b>Version 1.1 Title</b>	<b>N/E</b>	<b>Version 2 Code</b>	<b>Version 2 Title</b>	<b>Comments</b>
				and equipment	
NWP438A	Measure and process hydrometric stream discharge data in flood conditions	E	NWP421A	Collect, measure and process hydrologic stream discharge gauging	New unit based on NWP438A
NWP437A	Analyse data and produce hydrometric reports				Deleted. Contents addressed in new units NWP504A, NWP508A and NWP510A
NWP426B	Coordinate and monitor the operation of potable water systems	E	NWP403A	Investigate and plan the optimisation of potable water distribution systems	New unit based on NWP426B
NWP435B	Coordinate and monitor the optimisation of water treatment processes				Deleted
NWP436B	Coordinate and monitor the optimisation of wastewater treatment processes				Deleted

<b>Summary Mapping of NWP07 Version 1.1 to NWP07 Version 2 Units of Competency</b>					
N = Not Equivalent E = Equivalent					
<b>Version 1.1 Code</b>	<b>Version 1.1 Title</b>	<b>N/E</b>	<b>Version 2 Code</b>	<b>Version 2 Title</b>	<b>Comments</b>
			NWP404A	Apply principles of chemistry to water systems and processes	New unit. Replaces components of non-equivalent unit NWP435B
			NWP406A	Investigate and plan the optimisation of granular media filtration processes	New unit. Replaces components of non-equivalent unit NWP435B
			NWP407A	Investigate and plan the optimisation of dissolved air floatation processes	New unit. Replaces components of non-equivalent unit NWP435B
			NWP408A	Investigate and plan the optimisation of sedimentation and clarification processes	New unit. Replaces components of non-equivalent unit NWP435B
			NWP409A	Investigate and plan to optimise the operation of chemical addition processes	New unit. Replaces components of non-equivalent unit NWP435B

<b>Summary Mapping of NWP07 Version 1.1 to NWP07 Version 2 Units of Competency</b>					
N = Not Equivalent E = Equivalent					
<b>Version 1.1 Code</b>	<b>Version 1.1 Title</b>	<b>N/E</b>	<b>Version 2 Code</b>	<b>Version 2 Title</b>	<b>Comments</b>
NWP410B		E	NWP410C	Coordinate and monitor asset construction and maintenance	Updated and equivalent
			NWP411A	Select treatment requirements for waterborne microorganisms	New unit. Replaces components of non-equivalent unit NWP435B
			NWP412A	Investigate and plan the optimisation of activated sludge processes	New unit. Replaces components of non-equivalent unit NWP436B
			NWP413A	Investigate and plan the optimisation of anaerobic treatment processes	New unit. Replaces components of non-equivalent unit NWP436B
			NWP414A	Select strategies to control microbial impact on wastewater treatment processes	New unit. Replaces components of non-equivalent unit NWP436B
			NWP432A	Contribute to the continuous improvement of quality	New unit

### Summary Mapping of NWP07 Version 1.1 to NWP07 Version 2 Units of Competency

N = Not Equivalent E = Equivalent

Version 1.1 Code	Version 1.1 Title	N/E	Version 2 Code	Version 2 Title	Comments
				systems	
			NWP504A	Collect and manage hydrometric station survey data	New unit
			NWP508A	Apply principles of hydraulics to pipe and channel flows	New unit
			NWP509A	Collect, verify and report hydrometric time series data	New unit
			NWP510A	Develop and maintain ratings	New unit

<b>Summary Mapping of NWP07 Version 1.1 to NWP07 Version 2 Units of Competency</b>					
N = Not Equivalent E = Equivalent					
<b>Version 1.1 Code</b>	<b>Version 1.1 Title</b>	<b>N/E</b>	<b>Version 2 Code</b>	<b>Version 2 Title</b>	<b>Comments</b>
<b>Imported units of competency</b>					
BCCM2005B		E	RIICCM205A	Carry out manual excavation	Updated imported unit from RII09
BCCM2010B		E	RIICCM210A	Install trench support	Updated imported unit from RII09
BSBCM104A		E	BSBLED101A	Plans skills development	Updated imported unit from BSB07
BSBCM205A		E	BSBWOR204A	Use business technology	Updated imported unit from BSB07
BSBCM213A		E	BSBITU201A	Produce simple word processed documents	Updated imported unit from BSB07
BSBCM214A	Create and use simple spreadsheets	E	BSBITU202A	Create and use spreadsheets	Updated imported unit from BSB07
BSBFLM405B		E	BSBMGT402A	Implement operational plan	Updated imported unit from BSB07
BSBFLM505B		E	BSBMGT515A	Manage operational plan	Updated imported unit from BSB07
BSBFLM513A		E	BSBFIM501A	Manage budgets and financial plans	Updated imported unit from BSB07
BSBOHS303A		E	BSBOHS303B	Contribute to OHS hazard	Updated core imported unit



<b>Summary Mapping of NWP07 Version 1.1 to NWP07 Version 2 Units of Competency</b>					
N = Not Equivalent E = Equivalent					
<b>Version 1.1 Code</b>	<b>Version 1.1 Title</b>	<b>N/E</b>	<b>Version 2 Code</b>	<b>Version 2 Title</b>	<b>Comments</b>
				identification and risk assessment	from BSB07
BSBCMN302A		E	BSBWOR301A	Organise personal work priorities and development	Updated core imported unit from BSB07
BSBCMN402A		E	BSBWOR404A	Develop work priorities	Updated imported unit from BSB07
			MEM30027A	Prepare basic programs for programmable logic controllers	New imported unit
			MSACMT461A	Facilitate SCADA systems in a manufacturing team or work area	New imported unit
PSPPROC410A		E	PSPPROC414A	Manage contracts	Updated imported unit from PSP04
PSPPROC502A		E	PSPPROC506A	Plan to manage contracts	Updated imported unit from PSP04
			RTD3507A	Undertake sampling and testing of water	New imported unit

## Summary mapping of qualifications

Version 1.1 code	Version 1.1 title	N/E	Version 2 code	Version 2 title	Comments
NWP10107	Certificate I in Water Sustainability	E	NWP10110	Certificate I in Water Sustainability	New versions of core and elective units to reflect implementation in schools.

### Explanation of the review date

The review date (shown on the title page) indicates when the Training Package is expected to be reviewed in the light of changes such as changing technologies and circumstances. The review date is not an expiry date. Endorsed Training Packages and their components remain current until they are reviewed or replaced.

# Overview of Training Packages

## Overview of Training Packages

### What is a Training Package?

A Training Package is an integrated set of nationally endorsed competency standards, assessment guidelines and Australian Qualifications Framework (AQF) qualifications for a specific industry, industry sector or enterprise.

Each Training Package:

provides a consistent and reliable set of components for training, recognising and assessing people's skills, and may also have optional support materials

enables nationally recognised qualifications to be awarded through direct assessment of workplace competencies

encourages the development and delivery of flexible training which suits individual and industry requirements

encourages learning and assessment in a work-related environment which leads to verifiable workplace outcomes.

### How do Training Packages fit within the National Training Framework?

The National Training Framework is made up of the nationally agreed quality arrangements for the vocational education and training sector, the Australian Quality Training Framework (AQTF), and Training Packages endorsed by the National Quality Council (NQC).

### How are Training Packages developed?

Training Packages are developed by Industry Skills Councils or enterprises to meet the identified training needs of specific industries or industry sectors. To gain national endorsement of Training Packages, developers must provide evidence of extensive research, consultation and support within the industry area or enterprise.

### How do Training Packages encourage flexibility?

Training Packages describe the skills and knowledge needed to perform effectively in the workplace without prescribing how people should be trained.

Training Packages acknowledge that people can achieve vocational competency in many ways by emphasising what the learners can do, not how or where they learned to do it. For example, some experienced workers might be able to demonstrate competency against the units of competency, and even gain a qualification, without completing a formal training program.

With Training Packages, assessment and training may be conducted at the workplace, off the job, at a training organisation, during regular work, or through work experience, work placement, work simulation or any combination of these.

### Who can deliver and assess using Training Packages?

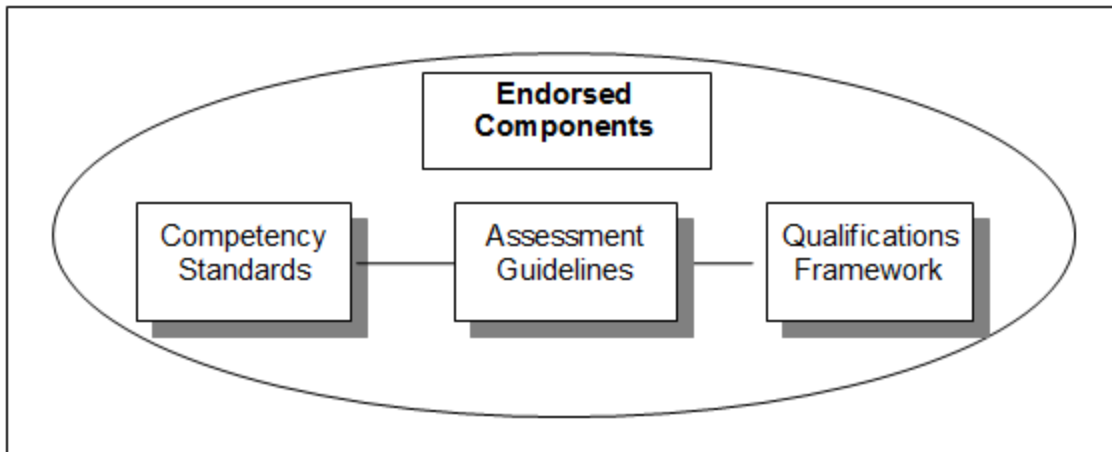
Training and assessment using Training Packages must be conducted by a registered training organisation (RTO) that has the qualifications or specific units of competency on its scope of registration, or that works in partnership with another RTO as specified in the AQTF *Standards for Registered Training Organisations*.

## Training Package components

Training Packages are made up of mandatory components endorsed by the NQC and optional support materials.

### Training Package endorsed components

The nationally endorsed components include the Competency Standards, Assessment Guidelines and Qualifications Framework. These form the basis of training and assessment in the Training Package and, as such, they must be used.



**Competency Standards**

Each unit of competency identifies a discrete workplace requirement and includes the knowledge and skills that underpin competency as well as language, literacy and numeracy; and occupational health and safety requirements. The units of competency must be adhered to in training and assessment to ensure consistency of outcomes.

**Assessment Guidelines**

The Assessment Guidelines provide an industry framework to ensure all assessments meet industry needs and nationally agreed standards as expressed in the Training Package and the *Standards for Registered Training Organisations*. The Assessment Guidelines must be followed to ensure the integrity of assessment leading to nationally recognised qualifications.

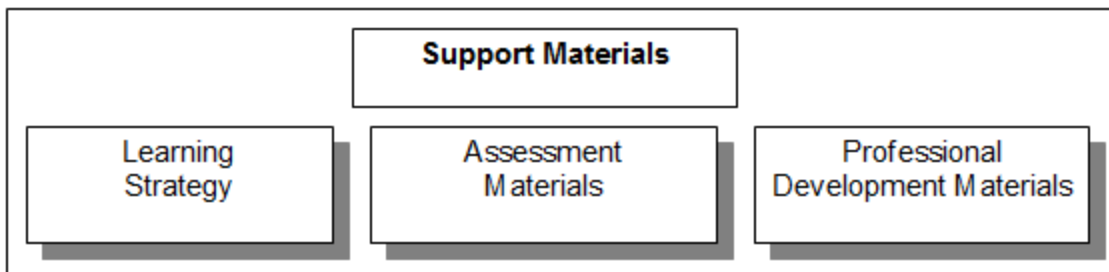
**Qualifications Framework**

Each Training Package provides details of those units of competency that must be achieved to award AQF qualifications. The rules around which units of competency can be combined to make up a valid AQF qualification in the Training Package are referred to as the ‘packaging rules’. The packaging rules must be followed to ensure the integrity of the nationally recognised qualifications issued.

**Training Package support materials**

The endorsed components of Training Packages are complemented and supported by optional support materials that provide for choice in the design of training and assessment to meet the needs of industry and learners.

Training Package support materials can relate to single or multiple units of competency, an industry sector, a qualification or the whole Training Package. They tend to fall into one or more of the categories illustrated below.



Training Package support materials are produced by a range of stakeholders such as RTOs, individual trainers and assessors, private and commercial developers and Government agencies.

Where such materials have been quality assured through a process of ‘noting’ by the NQC, they display the following official logo.



Noted support materials are listed on the National Training Information Service (NTIS), together with a detailed description and information on the type of product and its availability ([www.ntis.gov.au](http://www.ntis.gov.au)).

It is not compulsory to submit support materials for noting; any resources that meet the requirements of the Training Package can be used.

### **Training Package, qualification and unit of competency codes**

There are agreed conventions for the national codes used for Training Packages and their components. Always use the correct codes, exactly as they appear in the Training Package, and with the title always following the code.

#### **Training Package codes**

Each Training Package has a unique five-character national code assigned when the Training Package is endorsed, for example NWP07. The first three characters are letters identifying the Training Package industry coverage and the last two characters are numbers identifying the year of endorsement.

#### **Qualification codes**

Within each Training Package, each qualification has a unique eight-character code, e.g. NWP20107. The first three letters identify the Training Package; the first number identifies the qualification level (noting that Arabic numbers are not used in qualification titles themselves); the next two numbers identify the position in the sequence of the qualification at that level; and the last two numbers identify the year in which the qualification was endorsed. (Where qualifications are added after the initial Training Package endorsement, the last two numbers may differ from other Training Package qualifications as they identify the year in which those particular qualifications were endorsed.)

#### **Unit of competency codes**

Within each Training Package, each unit of competency has a unique code. The unit of competency codes are assigned when the Training Package is endorsed, or when new units of competency are added to an existing endorsed Training Package.

A typical code is made up of 12 characters, normally a mixture of uppercase letters and numbers, e.g. NWP260A. The first three characters signify the Training Package (NWP07 Water Training Package in the above example) and up to eight characters, relating to an industry sector, function or skill area, follow. The last character is always a letter and identifies the unit of competency version. The 'A' in the example above indicates that this is the original unit of competency. An incremented version identifier usually means that minor changes have been made. Typically this would mean that wording has changed in the range statement or evidence guide, providing clearer intent. Where changes are made that alter the outcome, a new code is assigned and the title is changed.

### **Training Package, qualification and unit of competency titles**

There are agreed conventions for titling Training Packages and their components. Always use the correct titles, exactly as they appear in the Training Package, and with the code always placed before the title.

#### **Training Package titles**

The title of each endorsed Training Package is unique and relates to the Training Package's broad industry coverage.

#### **Qualification titles**

The title of each endorsed Training Package qualification is unique. Qualification titles use the following sequence:

- firstly, the qualification is identified as either Certificate I, Certificate II, Certificate III, Certificate IV, Diploma or Advanced Diploma
- this is followed by the words 'in' for Certificates I to IV and 'of' for Diploma and Advanced Diploma
- then the industry descriptor follows, for example, Water Operations
- while the last element of this sequence is not applicable to this Training Package as it does not have streams, if applicable, the occupational or functional stream follows in brackets, for example (Computer Systems).

**Unit of competency titles**

The title of each unit of competency is unique. Unit of competency titles describe the competency outcome concisely and are written in sentence case.

For example:

- NWP208A Perform basic wastewater tests
- BSBWOR204A Use business technology.

# Introduction to NWP07 Water Training Package

## Introduction to NWP07 Water Training Package

NWP07 Water Training Package supports and provides training pathways for a diverse range of people working in water organisations across the nation.

The development of NWP07 has been conducted with high levels of involvement and support from the water industry. The project team responsible for the technical production of the Training Package has received a significant amount of advice and input and, importantly, has had open access to industry enterprises, associations and key stakeholders.

The qualifications and units of competency have been, throughout the project, subject to ongoing refinement and will be subject to further review as part of a process of continuous improvement in order to reflect the changing nature and skill development needs of the industry.

The NWP07 Water Training Package review project was overseen and led by a committee comprising:

- John Harris, Chair, GSA Director, Wannon Region Water Authority
- Chris Davis, Australian Water Association
- Ross Young, Water Services Association of Australia
- David Roberts, Goulburn Murray Water
- Wayne Morling, Water Corporation
- Peter Bernich, SA Water Corporation
- Stephen Wilson, Water Industry Training Centre
- George Wall, Water Industry Operators Association
- Kim Peterson, TAFE NSW
- Tracie Regan, SunWater
- Elizabeth Owers, Department of Further Education Employment, Science and Technology (SA)
- Kathi Eland, Department of Education Science and Training (DEST)
- Nicholas Crosling, Government Skills Australia Industry Skills Council.

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Members of the Water Industry Advisory Committee who were not represented on the project steering committee were:

- Paul O'Brien, Vic Water
- Brad Flanagan, Queensland Utilities and Services ITAB
- John Flett, Goulburn Murray Water
- Carl Peterson, NSW Local Government Water Directorate
- Kevin O'Brien, Northern Territory Power and Water
- Don Mackay, Open Learning Institute
- Lynn Hallam, Hobart Water
- Steve Weatherstone, NSW VTE ITAB.

Members of the project's specialist Industry Advisory Groups (IAGs) for the sectors of water treatment, wastewater treatment, hydrography, water catchment and dams, water supply distribution, wastewater collection and trade waste.

The development team would especially like to thank the following individuals within the following advisory groups for their contribution to the project.

### **Trade Waste IAG:**



David Hewett, Water Corporation  
Cameron Jackson, Brisbane Water  
Don Jackson, Power and Water  
Stephen Murphy, Sydney Water  
Peter Donlon, Water Services Association of Australia

**Hydrography IAG:**

Neil Harper, OTEN  
Peter Cations, Thiess Environmental Services  
Greg May, WA Department of Environment  
Mic Clayton, Australian Hydrographers Association

**Catchment/Dams IAG:**

Norm Himsley, NSW Dams Safety Committee  
Paul Heinrichs, Department of Energy, Utilities and Sustainability  
Paul O'Brien, Vic Water and Victorian Dams Reference Committee  
Wayne Morling, Water Corporation

The contribution of a number of water industry peak bodies should also be acknowledged for having advised their membership of ongoing project outcomes and provided avenues for consultation and feedback. These bodies include:

- Water Industry Operators Association
- Water Services Association of Australia
- Australian Water Association
- Water Directorate of Queensland
- Water Directorate of NSW
- Australian Hydrographers Association.
- 

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- SA Water
- Water Corporation
- Sydney Water
- Hobart Water
- ActewAGL
- Central Highlands Water
- Gippsland Water
- 

Special thanks go to Tracie Regan of SunWater who developed the dedicated Water Training Package Review Group hosted on the EdNA Groups website ([www.groups.edna.edu.au](http://www.groups.edna.edu.au)).

With over 25,000 hits recorded on this website, it has enabled industry to have ongoing input throughout the life of the project.

Government Skills Australia would like to thank the committee and the project team for their hard work and support in this long and complex project.

## Qualifications Framework

## Qualifications Framework

### The Australian Qualifications Framework

#### What is the Australian Qualifications Framework?

A brief overview of the Australian Qualifications Framework (AQF) follows. For a full explanation of the AQF see the *AQF Implementation Handbook, 3rd Edition 2002*. You can download it from the Australian Qualifications Framework Advisory Board (AQFAB) website ([www.aqf.edu.au](http://www.aqf.edu.au)) or obtain a hard copy by contacting AQFAB on phone 03 9639 1606 or by emailing AQFAB on [aqfab@curriculum.edu.au](mailto:aqfab@curriculum.edu.au)

The AQF provides a comprehensive, nationally consistent framework for all qualifications in post-compulsory education and training in Australia. In the vocational education and training (VET) sector it assists national consistency for all trainees, learners, employers and providers by enabling national recognition of qualifications and Statements of Attainment.

Training Package qualifications in the VET sector must comply with the titles and guidelines of the AQF. Endorsed Training Packages provide a unique title for each AQF qualification which must always be reproduced accurately.

#### Qualifications

Training Packages can incorporate the following six AQF qualifications.

- Certificate I in ...
- Certificate II in ...
- Certificate III in ...
- Certificate IV in ...
- Diploma of ...
- Advanced Diploma of ...

Graduate Certificates and Graduate Diplomas can also be awarded in the VET sector under certain conditions – see the *AQF Implementation Handbook* for details.

On completion of the requirements defined in the Training Package, a registered training organisation (RTO) may issue a nationally recognised AQF qualification. Issuance of AQF qualifications must comply with the advice provided in the *AQF Implementation Handbook* and the Australian Quality Training Framework (AQTF) *Standards for Registered Training Organisations*, particularly Standard 10.

#### Statement of Attainment

Where an AQF qualification is partially achieved through the achievement of one or more endorsed units of competency, an RTO may issue a Statement of Attainment. Issuance of Statements of Attainment must comply with the advice provided in the *AQF Implementation Handbook* and the AQTF *Standards for Registered Training Organisations*, particularly Standard 10.

Under the *Standards for Registered Training Organisations*, RTOs must recognise the achievement of competencies as recorded on a qualification or Statement of Attainment issued by other RTOs. Given this, recognised competencies can progressively build towards a full AQF qualification.

#### AQF guidelines and learning outcomes

The *AQF Implementation Handbook* provides a comprehensive guideline for each AQF qualification. A summary of the learning outcome characteristics and their distinguishing features for each VET-related AQF qualification is provided below.

## **Certificate I**

### **Characteristics of learning outcomes**

Breadth, depth and complexity of knowledge and skills would prepare a person to perform a defined range of activities most of which may be routine and predictable.

Applications may include a variety of employment-related skills, including preparatory access and participation skills, broad-based induction skills and/or specific workplace skills. They may also include participation in a team or work group.

#### *Distinguishing features of learning outcomes*

Do the competencies enable an individual with this qualification to:

- demonstrate knowledge by recall in a narrow range of areas
- demonstrate basic practical skills, such as the use of relevant tools
- perform a sequence of routine tasks given clear direction
- receive and pass on messages/information.

## **Certificate II**

### **Characteristics of learning outcomes**

Breadth, depth and complexity of knowledge and skills would prepare a person to perform in a range of varied activities or to apply knowledge application where there is a clearly defined range of contexts in which the choice of actions required is usually clear and there is limited complexity in the range of operations to be applied.

Performance of a prescribed range of functions involving known routines and procedures and some accountability for the quality of outcomes.

Applications may include some complex or non-routine activities involving individual responsibility or autonomy and/or collaboration with others as part of a group or team.

#### *Distinguishing features of learning outcomes*

Do the competencies enable an individual with this qualification to:

- demonstrate basic operational knowledge in a moderate range of areas
- apply a defined range of skills
- apply known solutions to a limited range of predictable problems
- perform a range of tasks where choice between a limited range of options is required
- assess and record information from varied sources
- take limited responsibility for own outputs in work and learning.

**Certificate III****Characteristics of learning outcomes**

Breadth, depth and complexity of knowledge and competencies covers selecting, adapting and transferring skills and knowledge to new environments and providing technical advice and some leadership in resolution of specified problems. This would be applied across a range of roles in a variety of contexts with some complexity in the extent and choice of options available.

Performance of a defined range of skilled operations, usually within a range of broader related activities involving known routines, methods and procedures, where some discretion and judgement is required in the selection of equipment, services or contingency measures and within known time constraints.

Applications may involve some responsibility for others. Participation in teams, including group or team coordination may be involved.

*Distinguishing features of learning outcomes*

Do the competencies enable an individual with this qualification to:

- demonstrate some relevant theoretical knowledge
- apply a range of well-developed skills
- apply known solutions to a variety of predictable problems
- perform processes that require a range of well-developed skills where some discretion and judgement is required
- interpret available information, using discretion and judgement
- take responsibility for own outputs in work and learning
- take limited responsibility for the output of others.

**Certificate IV****Characteristics of learning outcomes**

Breadth, depth and complexity of knowledge and competencies covering a broad range of varied activities or application in a wider variety of contexts most of which are complex and non-routine. Leadership and guidance are involved when organising activities of self and others as well as contributing to technical solutions of a non-routine or contingency nature.

Performance of a broad range of skilled applications, including the requirement to evaluate and analyse current practices, develop new criteria and procedures for performing current practices and provide some leadership and guidance to others in the application and planning of the skills.

Applications involve responsibility for and limited organisation of others.

*Distinguishing features of learning outcomes*

Do the competencies enable an individual with this qualification to:

- demonstrate understanding of a broad knowledge base incorporating some

theoretical concepts

- apply solutions to a defined range of unpredictable problems
- identify and apply skill and knowledge areas to a wide variety of contexts, with depth in some areas
- identify, analyse and evaluate information from a variety of sources
- take responsibility for own outputs in relation to specified quality standards
- take limited responsibility for the quantity and quality of the output of others.

## **Diploma**

### **Characteristics of learning outcomes**

Breadth, depth and complexity covering planning and initiation of alternative approaches to skills or knowledge applications across a broad range of technical and/or management requirements, evaluation and coordination.

The self-directed application of knowledge and skills, with substantial depth in some areas where judgement is required in planning and selecting appropriate equipment, services and techniques for self and others.

Applications involve participation in the development of strategic initiatives as well as personal responsibility and autonomy in performing complex technical operations or organising others. They may include participation in teams, including teams concerned with planning and evaluation functions. Group or team coordination may be involved.

The degree of emphasis on breadth as against depth of knowledge and skills may vary between qualifications granted at this level.

#### *Distinguishing features of learning outcomes*

Do the competencies or learning outcomes enable an individual with this qualification to:

- demonstrate understanding of a broad knowledge base incorporating theoretical concepts, with substantial depth in some areas
- analyse and plan approaches to technical problems or management requirements
- transfer and apply theoretical concepts and/or technical or creative skills to a range of situations
- evaluate information, using it to forecast for planning or research purposes
- take responsibility for own outputs in relation to broad quantity and quality parameters
- take some responsibility for the achievement of group outcomes.

## **Advanced Diploma**

### **Characteristics of learning outcomes**

Breadth, depth and complexity involving analysis, design, planning, execution and evaluation across a range of technical and/or management functions, including development of new criteria or applications or knowledge or procedures.

The application of a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts in relation to either varied or highly specific functions. Contribution to the development of a broad plan, budget or strategy is involved and accountability and responsibility for self and others in achieving the outcomes is involved.

Applications involve significant judgement in planning, design, technical or leadership/guidance functions related to products, services, operations or procedures.

The degree of emphasis on breadth as against depth of knowledge and skills may vary between qualifications granted at this level.

#### *Distinguishing features of learning outcomes*

Do the competencies or learning outcomes enable an individual with this qualification to:

- demonstrate understanding of specialised knowledge with depth in some areas
- analyse, diagnose, design and execute judgements across a broad range of technical or management functions
- generate ideas through the analysis of information and concepts at an abstract level
- demonstrate a command of wide-ranging, highly specialised technical, creative or conceptual skills
- demonstrate accountability for personal outputs within broad parameters
- demonstrate accountability for personal and group outcomes within broad parameters.

## **Qualifications and packaging rules**

The qualifications in this Training Package have been developed to support experienced industry practitioners and new entrants seeking to commence or develop a career within the water industry.

The principal operational qualifications have been developed with small generic core units and a wide range of elective units to reflect the very diverse nature of work roles in the water industry. The industry has supported the concept of a single generic qualification at each AQF level instead of a range of specialist qualifications. Where the selection of elective units of competency has led to competency in a specialised area of operation, RTOs delivering the Training Package have supported the noting of specialisations on Certificates of Attainment.

### **Industry specialisations**

All certificates in endorsed Training Packages can be customised to suit industry needs and RTOs are encouraged to develop and use industry specialisations (often called 'streams') relevant to their market and customers that are consistent with the packaging rules of NWP07. Because of the generic nature of other qualifications, industry specialisations are mainly relevant for Certificates II and III, although may be applied to other qualifications.

## Suggested specialisations

The following list is a suggestion of possible specialisations that may be appropriate to the water industry. RTOs have the authority to develop and use additional specialisations which comply with the packaging rules.

Specialisation names that may be used are:

- Water Treatment
- Wastewater Treatment
- Water Supply Distribution (Network)
- Wastewater Collection
- Trade Waste
- Catchment Operations
- Irrigation
- Dams Safety
- Dams Operations and Source Protection
- River Groundwater Diversions and Licensing
- Construction and Maintenance
- Hydrometric Monitoring.

## Developing an industry specialisation

An RTO may develop an industry specialisation relevant to their market and clientele. The RTO should consult with its industry partners to determine which units of competency are relevant to include within the industry specialisation.

The requirements for the industry specialisation must be consistent with the packaging rules for NWP07. An industry specialisation should include a range of units that focus more on the industry specialisation than a generic qualification.

An industry specialisation may import units from another endorsed Training Package, provided the importation is within the rules of importation detailed in the packaging rules of the associated NWP07 qualification. For example a Certificate III 'Hydrometric Monitoring' industry specialisation may import the maximum allowable three units from PML04 Laboratory Operations Training Package.

It should be noted that a qualification with an industry specialisation does not change the title of the qualification, although RTOs may choose to record the specialisation. The AQTF requirements must be complied with and the qualification or Statement of Attainment should clearly specify the units of competency achieved and where appropriate, the specialisation.

As an example, an RTO may choose to promote, deliver and award the:

**Certificate ### in Water Industry Operations**

OR may choose to promote, deliver and award a:

**Certificate ### in Water Industry Operations (Hydrometric Monitoring)**

Both will be consistent with NWP07 packaging rules and an RTO may choose to offer either or both according to market need.

NWP07 users are referred to the companion Training Package User Guide which provides guidance on the packaging of electives to meet specialisations for the principal operational occupations.

## Employability skills

## Employability skills

### Employability skills replacing key competency information from 2006

In May 2005, the approach to incorporate employability skills within Training Package qualifications and units of competency was endorsed. As a result, from 2006 employability skills will progressively replace key competency information in Training Packages.

### Background to employability skills

Employability skills are also sometimes referred to as generic skills, capabilities or key competencies. The employability skills discussed here build on the Mayer Committee's Key Competencies, which were developed in 1992 and attempted to describe generic competencies for effective participation in work.

The Business Council of Australia (BCA) and the Australian Chamber of Commerce and Industry (ACCI), produced the *Employability Skills for the Future* report in 2002 in consultation with other peak employer bodies and with funding provided by the Department of Education, Science and Training (DEST) and the Australian National Training Authority (ANTA). Officially released by Dr Nelson (Minister for Education, Science and Training) on 23 May 2002, copies of the report are available from the DEST website at: [www.dest.gov.au/archive/ty/publications/employability\\_skills/index.htm](http://www.dest.gov.au/archive/ty/publications/employability_skills/index.htm).

The report indicated that business and industry now require a broader range of skills than the Mayer Key Competencies Framework and featured an Employability Skills Framework identifying eight employability skills:<sup>1</sup>

<sup>1</sup> Personal attributes that contribute to employability were also identified in the report but are not part of the Employability Skills Framework

- communication
- teamwork
- problem solving
- initiative and enterprise
- planning and organising
- self-management
- learning
- technology.

The report demonstrated how employability skills can be further described for particular occupational and industry contexts by sets of facets. The facets listed in the report are the aspects of the employability skills that the sample of employers surveyed identified as being important work skills. These facets were seen by employers as being dependent both in their nature and priority on an enterprise's business activity.

### Employability Skills Framework

The following table contains the employability skills facets identified in the report *Employability Skills for the Future*.

Skill	Facets
Communication that contributes to	listening and understanding



<b>Skill</b>	<b>Facets</b> Aspects of the skill that employers identify as important. The nature and application of these facets will vary depending on industry and job type.
productive and harmonious relations across employees and customers	speaking clearly and directly writing to the needs of the audience negotiating responsively reading independently empathising using numeracy effectively understanding the needs of internal and external customers persuading effectively establishing and using networks being assertive sharing information speaking and writing in languages other than English
<b>Teamwork</b> that contributes to productive working relationships and outcomes	working across different ages irrespective of gender, race, religion or political persuasion working as an individual and as a member of a team knowing how to define a role as part of the team applying teamwork to a range of situations e.g. futures planning and crisis problem solving identifying the strengths of team members coaching and mentoring skills, including giving feedback
<b>Problem solving</b> that contributes to productive outcomes	developing creative, innovative and practical solutions showing independence and initiative in identifying and solving problems solving problems in teams applying a range of strategies to problem solving using mathematics, including budgeting and financial management to solve problems applying problem-solving strategies across a range of areas testing assumptions, taking into account the context of data and circumstances resolving customer concerns in relation to complex project

<b>Skill</b>	<b>Facets</b> Aspects of the skill that employers identify as important. The nature and application of these facets will vary depending on industry and job type.
	issues
<b>Initiative and enterprise</b> that contribute to innovative outcomes	<ul style="list-style-type: none"> <li>adapting to new situations</li> <li>developing a strategic, creative and long-term vision</li> <li>being creative</li> <li>identifying opportunities</li> <li>translating ideas into action</li> <li>generating a range of options</li> <li>initiating innovative solutions</li> </ul>
<b>Planning and organising</b> that contribute to long and short-term strategic planning	<ul style="list-style-type: none"> <li>managing time and priorities – setting time lines, coordinating tasks for self and with others</li> <li>being resourceful</li> <li>taking initiative and making decisions</li> <li>adapting resource allocations to cope with contingencies</li> <li>establishing clear project goals and deliverables</li> <li>allocating people and other resources to tasks</li> <li>planning the use of resources, including time management</li> <li>participating in continuous improvement and planning processes</li> <li>developing a vision and a proactive plan to accompany it</li> <li>predicting – weighing up risk, evaluating alternatives and applying evaluation criteria</li> <li>collecting, analysing and organising information</li> <li>understanding basic business systems and their relationships</li> </ul>
<b>Self-management</b> that contributes to employee satisfaction and growth	<ul style="list-style-type: none"> <li>having a personal vision and goals</li> <li>evaluating and monitoring own performance</li> <li>having knowledge and confidence in own ideas and visions</li> <li>articulating own ideas and visions</li> <li>taking responsibility</li> </ul>
<b>Learning</b> that contributes to ongoing	managing own learning

<b>Skill</b>	<b>Facets</b>
improvement and expansion in employee and company operations and outcomes	<p>Aspects of the skill that employers identify as important. The nature and application of these facets will vary depending on industry and job type.</p> <p>contributing to the learning community at the workplace</p> <p>using a range of mediums to learn – mentoring, peer support and networking, IT and courses</p> <p>applying learning to technical issues (e.g. learning about products) and people issues (e.g. interpersonal and cultural aspects of work)</p> <p>having enthusiasm for ongoing learning</p> <p>being willing to learn in any setting – on and off the job</p> <p>being open to new ideas and techniques</p> <p>being prepared to invest time and effort in learning new skills</p> <p>acknowledging the need to learn in order to accommodate change</p>
<b>Technology</b> that contributes to the effective carrying out of tasks	<p>having a range of basic IT skills</p> <p>applying IT as a management tool</p> <p>using IT to organise data</p> <p>being willing to learn new IT skills</p> <p>having the OHS knowledge to apply technology</p> <p>having the appropriate physical capacity</p>

### Employability Skills Summary

An Employability Skills Summary exists for each qualification. Summaries provide a lens through which to view employability skills at the qualification level and capture the key aspects or facets of the employability skills that are important to the job roles covered by the qualification. Summaries are designed to assist trainers and assessors to identify and include important industry application of employability skills in learning and assessment strategies. The following is important information for trainers and assessors about Employability Skills Summaries.

Employability Skills Summaries provide examples of how each skill is applicable to the job roles covered by the qualification.

Employability Skills Summaries contain general information about industry context which is further explained as measurable outcomes of performance in the units of competency in each qualification.

The detail in each Employability Skills Summary will vary depending on the range of job roles covered by the qualification in question.

Employability Skills Summaries are not exhaustive lists of qualification requirements or checklists of performance (which are separate assessment tools that should be designed by trainers and assessors after analysis at the unit level).

Employability Skills Summaries contain information that may also assist in building learners' understanding of industry and workplace expectations.

## Qualification pathways

### Qualification pathways

The qualifications described above have been designed to maximise flexibility and respond to a significant range of career pathways and needs.

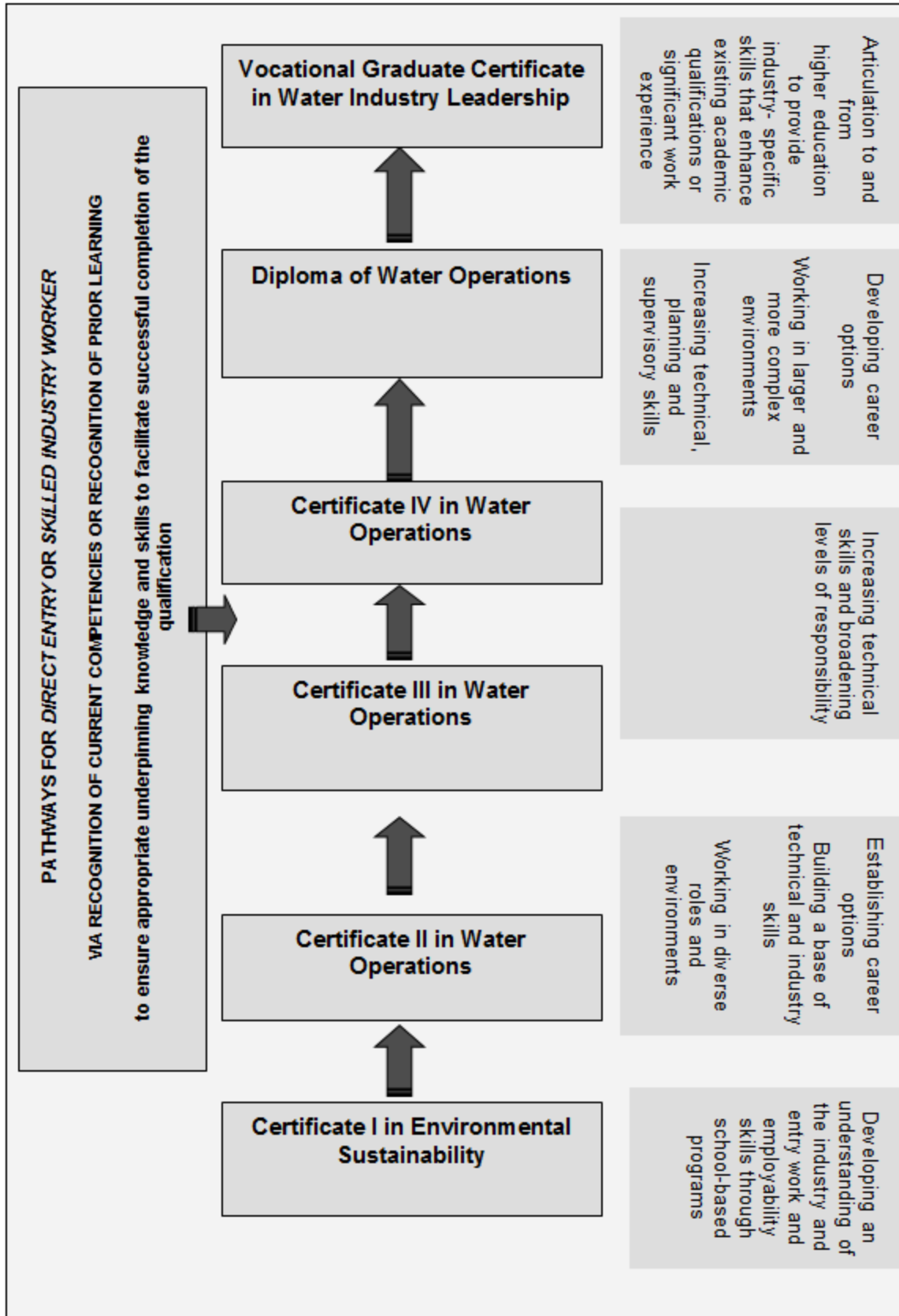
Government Skills Australia, the water industry and its peak associations have developed, and will continue to develop, valuable career and career-pathway advice which should also be used by RTOs and candidates when designing qualification packaging and selecting qualification pathways.

This industry advice is designed to assist candidates to make appropriate choices about the qualifications they can undertake to maximise their career choices, and to alert them to any industry accreditation or recognition requirements. Industry career and career-pathway advice is also valuable in explaining the opportunities that are available in various States and Territories for articulation between the VET sector and higher education qualifications. Candidates have the opportunity to seek articulation into a range of higher education qualifications and are provided with entry (including advanced standing or recognition of prior learning), depending on the individual higher education provider requirements and the experience of the candidate.

Career pathway and industry accreditation information will change over time and RTOs should contact Government Skills Australia or local industry groups or check the following websites for up-to-date advice:

Government Skills Australia	<a href="http://www.governmentskills.com.au">www.governmentskills.com.au</a>
Department of Education, Science and Training – career development site	<a href="http://www.dest.gov.au/sectors/career_development/default.htm">www.dest.gov.au/sectors/career_development/default.htm</a>
Department of Education, Science and Training – Job Guide	<a href="http://jobguide.dest.gov.au/">http://jobguide.dest.gov.au/</a>
Australian Apprenticeships Training Information Service	<a href="http://www.nacinfo.com.au">www.nacinfo.com.au</a>

State and Territory Training Authorities and state Industry Training Advisory Bodies will also have valuable career and career-pathway information.



# Assessment Guidelines

## Assessment Guidelines

### Introduction

These Assessment Guidelines provide the endorsed framework for assessment of units of competency in this Training Package. They are designed to ensure that assessment is consistent with the Australian Quality Training Framework (AQTF) *Standards for Registered Training Organisations*. Assessments against the units of competency in this Training Package must be carried out in accordance with these Assessment Guidelines.

### Assessment system overview

This section provides an overview of the requirements for assessment when using this Training Package, including a summary of the AQTF requirements, licensing or registration requirements and assessment pathways.

### Benchmarks for assessment

Assessment within the National Training Framework is the process of collecting evidence and making judgements about whether competency has been achieved in order to confirm whether an individual can perform to the standards expected in the workplace, as expressed in the relevant endorsed unit of competency.

In the areas of work covered by this Training Package, the endorsed units of competency are the benchmarks for assessment. As such, they provide the basis for nationally recognised Australian Qualifications Framework (AQF) qualifications and Statements of Attainment issued by registered training organisations (RTOs).

### Australian Quality Training Framework assessment requirements

Assessment leading to nationally recognised AQF qualifications and Statements of Attainment in the vocational education and training (VET) sector must meet the requirements of the AQTF as expressed in the *Standards for Registered Training Organisations*.

The *Standards for Registered Training Organisations* can be downloaded from the Department of Education, Science and Technology (DEST) website at [www.dest.gov.au](http://www.dest.gov.au) or can be obtained in hard copy from DEST. The following points summarise the assessment requirements under the AQTF.

### Registration of training organisations

Assessment must be conducted by, or on behalf of, an RTO formally registered by a state or territory registering/course accrediting body in accordance with the *Standards for Registered Training Organisations*. The RTO must have the specific units of competency and/or AQF qualifications on its scope of registration. See Section 1 of the *Standards for Registered Training Organisations*.

### Quality training and assessment

Each RTO must have systems in place to plan for and provide quality training and assessment across all its operations. See Standard 1 of the *Standards for Registered Training Organisations*.

### Assessor competency requirements

Each person involved in training, assessment or client service must be competent for the functions they perform. See Standard 7 of the *Standards for Registered Training Organisations* for assessor competency requirements. Standard 7 also specifies the competencies that must be held by trainers.

### Assessment requirements

The RTO's assessments must meet the requirements of the endorsed components of Training Packages within its scope of registration. See Standard 8 of the *Standards for Registered Training Organisations*.

### **Assessment strategies**

Each RTO must identify, negotiate, plan and implement appropriate learning and assessment strategies to meet the needs of each of its clients. See Standard 9 of the *Standards for Registered Training Organisations*.

### **Mutual recognition**

Each RTO must recognise the AQF qualifications and Statements of Attainment issued by any other RTO. See Standard 5 of the *Standards for Registered Training Organisations*.

### **Access and equity and client services**

Each RTO must apply access and equity principles, provide timely and appropriate information, advice and support services that assist clients to identify and achieve desired outcomes. This may include reasonable adjustment in assessment. See Standard 6 of the *Standards for Registered Training Organisations*.

### **Partnership arrangements**

RTOs must have, and comply with, written agreements with each organisation providing training and/or assessment on its behalf. See Standard 1.6 of the *Standards for Registered Training Organisations*.

### **Recording assessment outcomes**

Each RTO must have effective administration and records management procedures in place, and must record AQF qualifications and Statements of Attainment issued. See Standards 4 and 10.2 of the *Standards for Registered Training Organisations*.

### **Issuing AQF qualifications and Statements of Attainment**

Each RTO must issue AQF qualifications and Statements of Attainment that meet the requirements of the *AQF Implementation Handbook* and the endorsed Training Packages within the scope of its registration. An AQF qualification is issued once the full requirements for a qualification, as specified in the nationally endorsed Training Package, are met. A Statement of Attainment is issued where the individual is assessed as competent against fewer units of competency than required for an AQF qualification. See Standard 10 and Section 2 of the *Standards for Registered Training Organisations*.

## **Licensing or registration requirements**

While some functions performed by people working in the water industry, such as the use of some plant and equipment, are regulated or licensed in some or all of the States and Territories, generally the water industry does not have water-specific licensed occupations. It is important that RTOs and candidates make themselves familiar with the licensing and registration arrangements that apply in their jurisdiction.

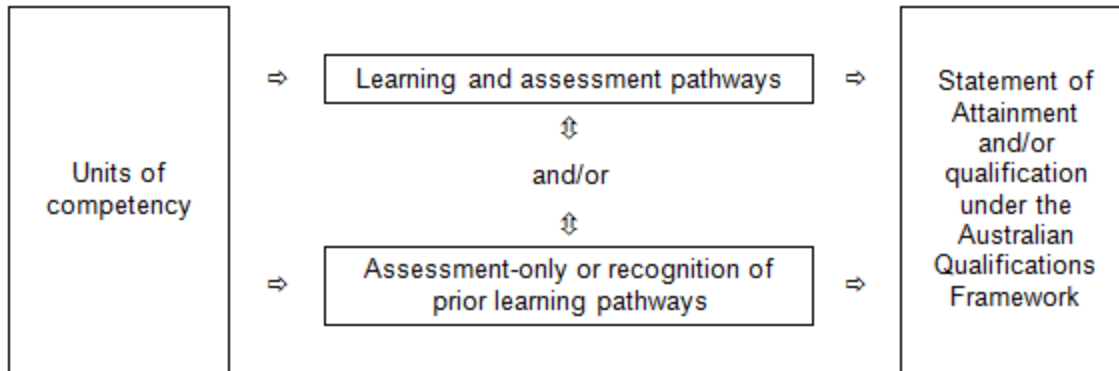
## **Pathways**

The competencies in this Training Package may be attained in a number of ways, including through:

- formal or informal education and training
- experiences in the workplace
- general life experience
- any combination of the above.



Assessment under this Training Package, leading to an AQF qualification or Statement of Attainment, may follow a learning and assessment pathway, an assessment-only or recognition pathway, or a combination of the two as illustrated in the following diagram.



Each of these assessment pathways leads to full recognition of competencies held – the critical issue is that the candidate is competent, not how the competency was acquired. Assessment, by any pathway, must comply with the assessment requirements set out in the *Standards for Registered Training Organisations*.

### **Learning and assessment pathways**

Usually, learning and assessment are integrated, with assessment evidence being collected and feedback provided to the candidate at any time throughout the learning and assessment process.

Learning and assessment pathways may include structured programs in a variety of contexts using a range of strategies to meet different learner needs. Structured learning and assessment programs could be group-based, work-based, project-based, self-paced and action learning-based; conducted by distance or e-learning; and/or involve practice and experience in the workplace.

Learning and assessment pathways to suit Australian Apprenticeships have a mix of formal structured training and structured workplace experience with formative assessment activities through which candidates can acquire and demonstrate skills and knowledge from the relevant units of competency.

### **Assessment-only or recognition of prior learning pathway**

Competencies already held by individuals can be formally assessed against the units of competency in this Training Package, and should be recognised regardless of how, when or where they were achieved.

In an assessment-only or recognition of prior learning (RPL) pathway, the candidate provides current, quality evidence of their competency against the relevant unit of competency. This process may be directed by the candidate and verified by the assessor, such as in the compilation of portfolios; or may be directed by the assessor, such as through observation of workplace performance and skills application, and oral or written assessment. Where the outcomes of this process indicate that the candidate is competent, structured training is not required. The RPL requirements of Standard 8.2 of the *Standards for Registered Training Organisations* must be met.

As with all assessment, the assessor must be confident that the evidence indicates that the candidate is currently competent against the endorsed unit of competency. This evidence may take a variety of forms and might include certification, references from past employers, testimonials from clients and work samples. The onus is on candidates to provide sufficient evidence to satisfy assessors that they currently hold the relevant competencies.

In judging evidence, the assessor must ensure that the evidence of prior learning is:

- authentic (the candidate's own work)
- valid (directly related to the current version of the relevant endorsed unit of competency)
- reliable (shows that the candidate consistently meets the endorsed unit of competency)
- current (reflects the candidate's current capacity to perform the aspect of the work covered by the endorsed unit of competency)
- sufficient (covers the full range of elements in the relevant unit of competency and addresses the four dimensions of competency, namely task skills, task management skills, contingency management skills and job/role environment skills).

The assessment-only or recognition of prior learning pathway is likely to be most appropriate in the following scenarios:

- candidates enrolling in qualifications who want RPL or recognition of current competencies
- existing workers
- individuals with overseas qualifications
- recent migrants with established work histories
- people returning to the workplace
- people with disabilities or injuries requiring a change in career.

### Combination of pathways

Where candidates for assessment have gained competencies through work and life experience and gaps in their competence are identified, or where they require training in new areas, a combination of pathways may be appropriate.

In such situations, the candidate may undertake an initial assessment to determine their current competency. Once current competency is identified, a structured learning and assessment program ensures that the candidate acquires the required additional competencies identified as gaps.

### Assessor requirements

This section identifies the mandatory competencies for assessors and clarifies how others may contribute to the assessment process where one person alone does not hold all the required competencies.

### Assessor competencies

The *Standards for Registered Training Organisations* specify mandatory competency requirements for assessors. For information, Standard 7.3 and 7.4 of the *Standards for Registered Training Organisations* follows:

- 7.3     **a**       The RTO must ensure assessments are conducted by a person who has:
- i    the following competencies from the Training and Assessment Training Package or is able to demonstrate equivalent competencies:
    - a    TAAASS401A Plan and organise assessment
    - b    TAAASS402A Assess competence
    - c    TAAASS404A Participate in assessment validation
  - ii   relevant vocational competencies, at least to the level being assessed.
- b**       However, if a person does not have the assessment competencies as defined in standard 7.3 a (i) and the vocational competencies as defined in standard 7.3 a (ii), one person with all the assessment competencies listed in standard 7.3 a (i) and one or more persons who have the vocational competencies listed in standard 7.3 a (ii) may work together to conduct the assessments.

## Designing assessment tools

This section provides an overview on the use and development of assessment tools.

### Use of assessment tools

Assessment tools provide a means of collecting the evidence that assessors use in making judgements about whether candidates have achieved competency.

There is no set format or process for the design, production or development of assessment tools. Assessors may use prepared assessment tools such as those specifically developed to support this Training Package or they may develop their own.

### **Using prepared assessment tools**

If using prepared assessment tools, assessors should ensure these are benchmarked or mapped against the current version of the relevant unit of competency. This can be done by checking that the materials are listed on the National Training Information Service website ([www.ntis.gov.au](http://www.ntis.gov.au)). Materials on the list have been noted by the National Quality Council as meeting its quality criteria for Training Package support materials.

### **Developing assessment tools**

When developing their own assessment tools, assessors must ensure that the tools: are benchmarked against the relevant unit or units of competency are reviewed as part of the validation of assessment strategies as required under 9.2i of the *Standards for Registered Training Organisations* meet the assessment requirements expressed in the *Standards for Registered Training Organisations*, particularly Standards 8 and 9.

A key reference for assessors developing assessment tools is TAA04 Training and Assessment Training Package and the unit of competency TAAASS403A *Develop assessment tools*.

### **Conducting assessment**

This section details the mandatory assessment requirements and provides information on equity in assessment including reasonable adjustment.

### **Mandatory assessment requirements**

Assessments must meet the criteria set out in Standard 8 from the *Standards for Registered Training Organisations*. For information, Standard 8 of the *Standards for Registered Training Organisations* is reproduced below.

## 8. RTO Assessments

The RTO's assessments meet the requirements of the endorsed components of Training Packages and the outcomes specified in accredited courses within the scope of its registration.

### 8.1 The RTO must ensure that assessments (including RPL):

- i. comply with the Assessment Guidelines included in the applicable nationally endorsed Training Packages or the assessment requirements specified in accredited courses;
- ii. lead to the issuing of a statement of attainment or qualification under the AQF when a person is assessed as competent against nationally endorsed unit(s) of competency in the applicable Training Package or modules specified in the applicable accredited course;
- iii. are valid, reliable, fair and flexible;
- iv. provide for applicants to be informed of the context and purpose of the assessment and the assessment process;
- v. where relevant, focus on the application of knowledge and skill to the standard of performance required in the workplace and cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills;
- vi. involve the evaluation of sufficient evidence to enable judgements to be made about whether competency has been attained;
- vii. provide for feedback to the applicant about the outcomes of the assessment process and guidance on future options in relation to those outcomes;
- viii. are equitable for all persons, taking account of individual needs relevant to the assessment; and
- ix. provide for reassessment on appeal.

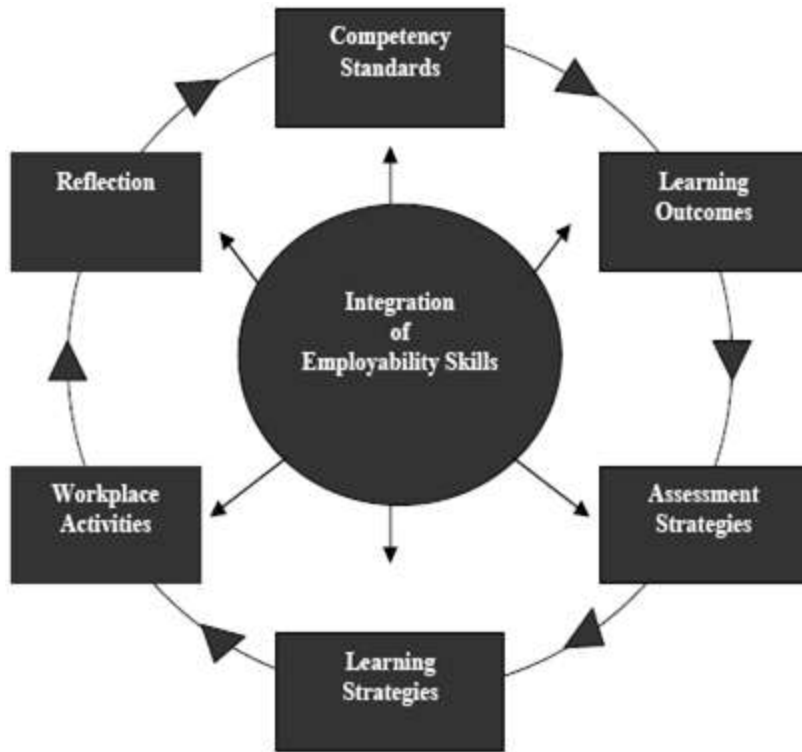
### 8.2 a The RTO must ensure RPL is offered to all applicants on enrolment.

#### b The RTO must have an RPL process that:

- i. is structured to minimise the time and cost to applicants; and
- ii. provides adequate information, support and opportunities for participants to engage in the RPL process.

## Delivery and assessment of employability skills

Employability skills are integral to workplace competency and, as such, must be considered in the design, customisation, delivery and assessment of VET programs in an integrated and holistic way, as represented diagrammatically below.



Training providers must analyse the employability skills information contained in units of competency in order to design valid and reliable learning and assessment strategies. This analysis includes:

reviewing unit(s) of competency to determine how each relevant employability skill is found and applied within the unit

analysing the Employability Skills Summary for the qualification in which the unit(s) is/are packaged to help clarify relevant industry/workplace contexts with regard to the application of employability skills at that qualification level

designing learning and assessment activities that address the employability skills requirements.

## **Employability skills in context**

Candidates undertaking the qualifications in this Training Package are diverse in nature, varying from students undertaking VET in Schools programs through to people involved in other forms of pre-employment or early-employment programs or operational staff in a wide range of water applications and resource management. As a result of this diversity, the Employability Skills Summary Tables will be representative of the water industry in general and will vary in relation to specific job roles.

The flexibility and broad scope of qualifications are reflected in the extensive list of elective units of competency. Learning and assessment strategies for each qualification should be based on the requirements identified in units of competency that meet the packaging guidelines, without additional requirements for the facets of employability skills.

Employability Skills Summaries of qualifications capture what might be typical of each qualification but will be influenced by the selection of electives.

## **Access and equity**

An individual's access to the assessment process should not be adversely affected by restrictions placed on the location or context of assessment beyond the requirements specified in this Training Package.

Reasonable adjustments can be made to ensure equity in assessment for people with disabilities. Adjustments include any changes to the assessment process or context that meet the individual needs of the person with a disability but do not change competency outcomes. Such adjustments are considered 'reasonable' if they do not impose an unjustifiable hardship on a training provider or employer. When assessing people with disabilities, assessors are encouraged to apply good practice assessment methods with sensitivity and flexibility.

## **Further sources of information**

The section provides a listing of useful contacts and resources to assist assessors in planning, designing, conducting and reviewing assessment against this Training Package.

### **Contacts**

Government Skills Australia  
Level 2, 47-49 Waymouth Street,  
Adelaide SA Australia 5000

TVET Australia Ltd  
Level 21, 390 St Kilda Road  
Melbourne VIC 3004

Tel: 08 8410 3455  
Fax: 08 8410 2842

Web: [www.governmentskills.com.au](http://www.governmentskills.com.au)  
Email: [info@governmentskills.com.au](mailto:info@governmentskills.com.au)

Innovation and Business Skills Australia  
Level 2, Building B, 192 Burwood Road  
HAWTHORN VIC 3122

Telephone: (03) 9815 7000

Facsimile: (03) 9815 7001

Web: [www.ibsa.org.au](http://www.ibsa.org.au)  
Email: [admin@bsitab.org](mailto:admin@bsitab.org)

PO Box 12211  
MELBOURNE VIC 8006

Tel: 03 9832 8100  
Fax: 03 9832 8199

Web: [www.atpl.net.au](http://www.atpl.net.au)  
Email: [sales@atpl.net.au](mailto:sales@atpl.net.au)

### General resources

Refer to <http://antapubs.dest.gov.au/publications/search.asp> to locate the following ANTA publications.

*AQF Implementation Handbook, Third Edition*. Australian Qualifications Framework Advisory Board, 2002, [www.aqf.edu.au](http://www.aqf.edu.au)

Australian Quality Training Framework (AQTF) – for general information go to:  
[www.dest.gov.au/sectors](http://www.dest.gov.au/sectors)

Australian Quality Training Framework (AQTF) – for resources and information go to:  
[www.dest.gov.au](http://www.dest.gov.au)

Australian Quality Training Framework *Standards for Registered Training Organisations*, Australian National Training Authority, Melbourne, 2005. Available in hard copy from State and Territory Training Authorities or can be downloaded from [www.dest.gov.au](http://www.dest.gov.au)

*TAA04 Training and Assessment Training Package*. This is available from the Innovation and Business Skills Australia (IBSA) Industry Skills Council and can be viewed, and components downloaded, from the National Training Information Service (NTIS)

National Training Information Service, an electronic database providing comprehensive information about RTOs, Training Packages and accredited courses – [www.ntis.gov.au](http://www.ntis.gov.au)

*Style Guide for Training Package Support Materials*, Australian National Training Authority, Melbourne, 2003. Can be downloaded from the ANTA page at [www.dest.gov.au](http://www.dest.gov.au)

### Assessment resources



*Training Package Assessment Guides* — a range of resources to assist RTOs in developing Training Package assessment materials developed by ANTA with funding from the Department of Education, Training and Youth Affairs. It is made up of 10 separate titles, as described at the ANTA publications page of [www.dest.gov.au](http://www.dest.gov.au). Go to [www.resourcegenerator.gov.au/loadpage.asp?TPAG.htm](http://www.resourcegenerator.gov.au/loadpage.asp?TPAG.htm)

Printed and/or CD ROM versions of the Guides can be purchased from Australian Training Products (ATP). The resource includes the following guides:

1. Training Package Assessment Materials Kit
2. Assessing Competencies in Higher Qualifications
3. Recognition Resource
4. Kit to Support Assessor Training
5. Candidate's Kit: Guide to Assessment in New Apprenticeships
6. Assessment Approaches for Small Workplaces
7. Assessment Using Partnership Arrangements
8. Strategies for Ensuring Consistency in Assessment
9. Networking for Assessors
10. Quality Assurance Guide for Assessment

An additional guide *Delivery and Assessment Strategies* has been developed to complement these resources.

### **Assessment tool design and conducting assessment**

VETASSESS and Western Australian Department of Training and Employment 2000, *Designing Tests – Guidelines for designing knowledge based tests for Training Packages*

Vocational Education and Assessment Centre 1997, *Designing Workplace Assessment Tools, A self-directed learning program*, NSW TAFE

Manufacturing Learning Australia 2000, *Assessment Solutions*, Australian Training Products, Melbourne

Rumsey, David 1994, *Assessment practical guide*, Australian Government Publishing Service, Canberra

### **Assessor training**

Australian Committee on Training Curriculum (ACTRAC) 1994, *Assessor training program – learning materials*, Australian Training Products, Melbourne

Australian National Training Authority, *A Guide for Professional Development*, ANTA, Brisbane

Australian Training Products Ltd *Assessment and Workplace Training, Training*

*Package – Toolbox*, ATPL Melbourne

Green, M, et al. 1997, *Key competencies professional development Package*, Department for Education and Children's Services, South Australia

Victorian TAFE Association 2000, *The professional development CD: A learning tool*, VTA, Melbourne

### **Assessment system design and management**

Office of Training and Further Education 1998, *Demonstrating best practice in VET project – assessment systems and processes*, OTFE Victoria

Toop, L., Gibb, J. and Worsnop, P. *Assessment system designs*, Australian Government Publishing Service, Canberra

Western Australia Department of Training and VETASSESS 1998, *Kit for Skills Recognition Organisations*, WADOT, Perth

### **Access and equity resources**

Regularly check DEST publications for supporting resources (including ANTA publications): [http://www.dest.gov.au/sectors/training\\_skills/publications\\_resources](http://www.dest.gov.au/sectors/training_skills/publications_resources)

Working with Diversity

AQTF supporting resources (in DEST Publications catalogue)

[http://www.dest.gov.au/sectors/training\\_skills/publications\\_resources/profiles/anta/profile/working\\_diversity\\_guide\\_to\\_equity\\_and\\_the\\_aqtf.htm](http://www.dest.gov.au/sectors/training_skills/publications_resources/profiles/anta/profile/working_diversity_guide_to_equity_and_the_aqtf.htm)

Working with Diversity: A Guide to Equity and the AQTF

Working with Diversity: Quality Training for People with a Disability

Working with Diversity: Quality Training for Indigenous Australians

### **Flexible learning resources**

Search for access and equity, disability, diversity, indigenous, rural and remote ([www.flexiblelearning.net.au](http://www.flexiblelearning.net.au))

### **Legislation**

*Racial Discrimination Act 1975* <http://scaleplus.law.gov.au/html/pasteact/0/47/top.htm>

*Disability Discrimination Act 1992 (DDA)*

<http://scaleplus.law.gov.au/html/pasteact/0/311/top.htm>

Human Rights and Equal Opportunity Commission <http://www.hreoc.gov.au>

Equal Opportunity in the Workplace Agency (EOWA). <http://www.eowa.gov.au/>

### **Language and literacy**

Adult literacy: <http://www.dest.gov.au/literacynet/>

### **Indigenous**

*Partners in a Learning Culture National Strategy and Blueprint for Implementation*

[http://www.dest.gov.au/sectors/training\\_skills/publications\\_resources/profiles/anta/profile/partners\\_in\\_a\\_learning\\_culture\\_executive\\_summary.htm](http://www.dest.gov.au/sectors/training_skills/publications_resources/profiles/anta/profile/partners_in_a_learning_culture_executive_summary.htm)

Australian Indigenous Training Advisory Council (AITAC)

[http://www.dest.gov.au/sectors/training\\_skills/policy\\_issues\\_reviews/key\\_issues/nts/vet/aitac.htm](http://www.dest.gov.au/sectors/training_skills/policy_issues_reviews/key_issues/nts/vet/aitac.htm)

Indigenous Education Online <http://indigo.dest.gov.au/>

Australian Government Indigenous portal [www.indigenous.gov.au](http://www.indigenous.gov.au)

Indigenous Education Consultative Bodies (IECB): contact state and territory training authorities, or telephone 1800 800 821, or go to

[http://www.dest.gov.au/sectors/indigenous\\_education/organisation\\_contacts](http://www.dest.gov.au/sectors/indigenous_education/organisation_contacts)

### **Disability**

Australian Disability Training Advisory Council (ADTAC)

[http://www.dest.gov.au/sectors/training\\_skills/policy\\_issues\\_reviews/key\\_issues/nts/vet/adtac.htm](http://www.dest.gov.au/sectors/training_skills/policy_issues_reviews/key_issues/nts/vet/adtac.htm)

Australian Disability Clearinghouse on Education and Training (**ADCET**)

[www.adcet.edu.au](http://www.adcet.edu.au)

Disability employment agencies: contact state and territory offices of Department of Family and Community Services for details of local disability employment agencies, or go to <http://www.facs.gov.au/internet/facsinternet.nsf/disabilities/services-cdes.htm>

*Bridging Pathways. National strategy for increasing opportunities for people with a disability in VET*

[http://www.dest.gov.au/sectors/training\\_skills/publications\\_resources/profiles/anta/profile/bridging\\_pathways\\_revised\\_blueprint.htm](http://www.dest.gov.au/sectors/training_skills/publications_resources/profiles/anta/profile/bridging_pathways_revised_blueprint.htm)

### **Women**

*Women: Shaping Our Future*

<http://antapubs.dest.gov.au/publications/publication.asp?qsID=607>

# Competency Standards

## Competency Standards

### What is competency?

The broad concept of industry competency concerns the ability to perform particular tasks and duties to the standard of performance expected in the workplace. Competency requires the application of specified skills, knowledge and attitudes relevant to effective participation in an industry, industry sector or enterprise

Competency covers all aspects of workplace performance and involves performing individual tasks; managing a range of different tasks; responding to contingencies or breakdowns; and dealing with the responsibilities of the workplace, including working with others. Workplace competency requires the ability to apply relevant skills, knowledge and attitudes consistently over time and in the required workplace situations and environments. In line with this concept of competency, Training Packages focus on what is expected of a competent individual in the workplace as an outcome of learning, rather than focusing on the learning process itself.

Competency standards in Training Packages are determined by industry to meet identified industry skill needs. Competency standards are made up of a number of units of competency each of which describes a key function or role in a particular job function or occupation. Each unit of competency within a Training Package is linked to one or more AQF qualifications.

### Contextualisation of units of competency by RTOs

Registered training organisations (RTOs) may contextualise units of competency to reflect local outcomes required. Contextualisation could involve additions or amendments to the unit of competency to suit particular delivery methods, learner profiles, specific enterprise equipment requirements, or to otherwise meet local needs. However, the integrity of the overall intended outcome of the unit of competency must be maintained.

Any contextualisation of units of competency in this endorsed Training Package must be within the bounds of the following advice. In contextualising units of competency, RTOs: must not remove or add to the number and content of elements and performance criteria may add specific industry terminology to performance criteria where this does not distort or narrow the competency outcomes

may make amendments and additions to the range statement as long as such changes do not diminish the breadth of application of the competency and reduce its portability

may add detail to the evidence guide in areas such as the critical aspects of evidence or resources and infrastructure required where these expand the breadth of the competency but do not limit its use.

### Components of units of competency

The components of units of competency are summarised below, in the order in which they appear in each unit of competency.

#### Unit title

The unit title is a succinct statement of the outcome of the unit of competency. Each unit of competency title is unique, both within and across Training Packages.

#### Unit descriptor

The unit descriptor broadly communicates the content of the unit of competency and the skill area it addresses. Where units of competency have been contextualised from units of competency from other endorsed Training Packages, summary information is provided. There may also be a brief second paragraph that describes its relationship with other units of competency and any licensing requirements.

**Employability Skills statement**

A standard employability skills statement appears in each unit of competency. This statement directs trainers and assessors to consider the information contained in the Employability Skills Summary in which the unit of competency is packaged.

**Prerequisite units (optional)**

If there are any units of competency that must be completed before the unit, these will be listed.

**Application of the unit**

This subsection fleshes out the unit of competency's scope, purpose and operation in different contexts, for example, by showing how it applies in the workplace.

**Competency field (optional)**

The competency field either reflects the way the units of competency are categorised in the Training Package or denotes the industry sector, specialization or function. It is an optional component of the unit of competency.

**Sector (optional)**

The industry sector is a further categorisation of the competency field and identifies the next classification, for example an elective or supervision field.

**Elements of competency**

The elements of competency are the basic building blocks of the unit of competency. They describe in terms of outcomes the significant functions and tasks that make up the competency.

**Performance criteria**

The performance criteria specify the required performance in relevant tasks, roles, skills and in the applied knowledge that enables competent performance. They are usually written in passive voice. Critical terms or phrases may be written in bold italics and then defined in range statement, in the order of their appearance in the performance criteria.

**Required skills and knowledge**

The essential skills and knowledge are either identified separately or combined. Knowledge identifies what a person needs to know to perform the work in an informed and effective manner. Skills describe the application of knowledge to situations where understanding is converted into a workplace outcome.

**Range statement**

The range statement provides a context for the unit of competency, describing 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. As applicable, the meanings of key terms used in the performance criteria will also be explained in the range statement.

**Evidence guide**

The evidence guide is critical in assessment as it provides information to the RTO and assessor about how the described competency may be demonstrated. The evidence guide does this by providing a range of evidence for the assessor to make determinations, and by providing the assessment context.

The evidence guide describes:

conditions under which competency must be assessed including variables such as the assessment environment or necessary equipment  
relationships with the assessment of any other units of competency  
suitable methodologies for conducting assessment including the potential for workplace simulation  
resource implications, for example access to particular equipment, infrastructure or situations  
**how consistency in performance can be assessed over time, various contexts and with a range of evidence, and expectations at the AQF qualification level involved**  
the required underpinning knowledge and skills.

## Employability skills in units of competency

The detail and application of employability skills facets will vary according to the job-role requirements of each industry. In developing Training Packages, industry stakeholders are consulted to identify appropriate facets of employability skills which are incorporated into the relevant units of competency and qualifications.

Employability skills are not a discrete requirement contained in units of competency (as was the case with Key Competencies). Employability skills are specifically expressed in the context of the work outcomes described in units of competency and will appear in elements, performance criteria, range statements and evidence guides. As a result, users of Training Packages are required to review the entire unit of competency in order to accurately determine employability skills requirements.

### How employability skills relate to the key competencies

The eight nationally agreed employability skills now replace the seven key competencies in Training Packages. Trainers and assessors who have used Training Packages prior to the introduction of employability skills may find the following comparison useful.

Employability skills	Key competencies
Communication	Communicating ideas and information
Teamwork	Working with others and in teams
Problem solving	Solving problems Using mathematical ideas and techniques
Initiative and enterprise	
Planning and organising	Collecting, analysing and organising information Planning and organising activities
Self-management	
Learning	
Technology	Using technology

When analysing the above table it is important to consider the relationship and natural overlap of employability skills. For example, using technology may involve communication skills and combine the understanding of mathematical concepts.

### **Explicitly embedding employability skills in units of competency**

This Training Package seeks to ensure that industry-endorsed employability skills are explicitly embedded in units of competency. The application of each skill and the level of detail included in each part of the unit will vary according to industry requirements and the nature of the unit of competency.

Employability skills must be both explicit and embedded within units of competency. This means that employability skills will be:

#### **embedded in units of competency as part of the other performance requirements that make up the competency as a whole**

explicitly described within units of competency to enable Training Packages users to identify accurately the performance requirements of each unit with regards to employability skills. This Training Package also seeks to ensure that employability skills are well-defined and written into units of competency so that they are apparent, clear and can be delivered and assessed as an essential component of unit work outcomes.

The following table contains examples of embedded employability skills for each component of a unit of competency. Please note that in the examples below the bracketed skills are provided only for clarification and will not be present in units of competency within this Training Package

<b>Unit descriptor</b>	This unit covers the skills and knowledge required to promote the use and implementation of innovative work practices to effect change. (initiative and enterprise)
<b>Element</b>	Proactively resolve issues. (problem solving)
<b>Performance criteria</b>	Information is organised in a format suitable for analysis and dissemination in accordance with organisational requirements. (planning and organising)
<b>Range statement</b>	Software applications may include email, internet, word processing, spreadsheet, database or accounting packages. (technology)
<b>Required skills and knowledge</b>	Modify activities depending on differing workplace contexts, risk situations and environments. (learning) Work collaboratively with others during an emergency. (teamwork) Instructions, procedures and other information relevant to the maintenance of assets and security. (communication)
<b>Evidence guide</b>	Evidence of having worked constructively with a wide range of customers, suppliers and stakeholders to solve problems and adapt

	<p>or design new solutions to meet identified needs in customer services. In particular, evidence must be obtained on the ability to:</p> <ul style="list-style-type: none"><li>• assess response options to identified customer needs and determine the optimal action to be implemented (problem solving)</li><li>• in consultation with relevant others, design an initiative to address identified issues. (initiative and enterprise).</li></ul>
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## **NWP10110 Certificate I in Water Sustainability**

### **Modification History**

Not applicable.

### **Description**

The Certificate I in Environmental Sustainability provides pathways into the water industry for, in particular, young people who are seeking an opportunity to gain experience of the industry while developing a set of valuable employability skills.

To achieve this qualification the candidate must demonstrate competency in seven units of competency, comprising:

- four core units
- two industry project units
- two pathways units specifically incorporating employability skills
- three elective units.
- 

### **Pathways Information**

Not applicable.

### **Licensing/Regulatory Information**

Not applicable.

### **Entry Requirements**

Not applicable.

## Employability Skills Summary

### Employability Skills Qualification Summary

**Qualification code:** NWP10110

**Qualification title:** Certificate I in Water Sustainability

The following table contains a summary of the employability skills as identified by the water industry for this qualification. The employability skills facets described here are broad industry requirements that may vary depending on qualification packaging options.

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Communication</b>	<ul style="list-style-type: none"> <li>• communicates effectively and appropriately with others</li> <li>• reads and interprets workplace information accurately</li> <li>• uses literacy skills in regard to written and verbal communication in the workplace</li> <li>• uses basic interpersonal and communication skills (including listening and questioning, receiving feedback)</li> <li>• records and relays relevant information</li> <li>• understands relevant definitions, terminology, symbols and language</li> <li>• interprets maps and simple plans</li> <li>• explains water systems</li> <li>• follows instructions</li> <li>• maintains and checks records and documents</li> <li>• reports and documents water-related research and projects</li> <li>• uses correct water industry terminology when communicating and reporting</li> </ul>
<b>Teamwork</b>	<ul style="list-style-type: none"> <li>• works collaboratively and effectively with team members</li> <li>• applies work procedures accurately and in a timely manner</li> <li>• relates positively to fellow team members</li> <li>• applies procedures for maintaining a tidy and clean personal work area</li> <li>• works cooperatively and collaboratively with others to complete tasks</li> </ul>

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Problem solving</b>	<ul style="list-style-type: none"> <li>• researches, assesses and explains a limited range of principles and functions of water systems</li> <li>• responds effectively to hazards, risks and emergencies</li> <li>• performs mathematical and scientific calculations</li> <li>• applies water testing processes</li> <li>• uses appropriate techniques to solve or report problems identified when completing work tasks</li> <li>• applies scientific principles to the design, construction and operation of a working model of a water system</li> </ul>
<b>Initiative and enterprise</b>	<ul style="list-style-type: none"> <li>• identifies risks and hazards</li> <li>• takes opportunities to work with team members and supervisors to improve processes</li> <li>• takes appropriate initiative to deal with problems and complete tasks</li> </ul>
<b>Planning and organising</b>	<ul style="list-style-type: none"> <li>• plans personal work</li> <li>• researches, explores, assesses and explains a limited range of principles and functions of water systems</li> <li>• investigates local water and wastewater systems</li> <li>• researches, assesses and reports on water systems and water quality, distribution and treatment</li> <li>• plans water sampling and testing</li> <li>• plans and designs a basic water system</li> </ul>
<b>Self management</b>	<ul style="list-style-type: none"> <li>• adapts and modifies activities depending on differing workplace contexts and environments</li> <li>• plans skills development</li> <li>• identifies and responds to risks to personal wellbeing which may affect safe performance in the workplace</li> <li>• recognises limitations in skills and experience, asks for help and seeks clarification or information about work requirements and procedures</li> </ul>

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Learning</b>	<ul style="list-style-type: none"> <li>• undertakes research on a limited range of water systems and management</li> <li>• seeks and applies feedback on personal performance</li> <li>• plans skills development</li> <li>• checks and confirms policies, procedures and legislative requirements</li> <li>• checks systems and equipment used in the workplace and the instructions, processes and precautions for their use</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• uses technical equipment for measuring, sampling, testing and making adjustments</li> <li>• uses computer equipment for recording data, researching on the internet, and using graphic simulations, plans and diagrams</li> <li>• uses work-related plant, equipment and tools</li> <li>• identifies and correctly uses equipment, tools and other technology required to complete project tasks, including scientific equipment, computers, and safety and field equipment</li> <li>• applies procedures for identifying and using suitable work-related technology when carrying out project calculations</li> </ul>

The diverse nature of the candidates undertaking this qualification may include students undertaking VET in Schools programs or people involved in other forms of pre-employment or early employment programs. Therefore, the facets of the above employability skills are representative of the water industry in general and may not reflect specific job roles. Learning and assessment strategies for this qualification should be based on the requirements as identified in units of competency that meet packaging guidelines. This table is a summary of employability skills that are typical of this qualification and should not be interpreted as definitive.

## Packaging Rules

<b>Core</b>		
<i>All core units must be completed.</i>		
Industry project units	NWP101B	Investigate sustainable water cycle management
	NWP102B	Design a basic water system model

<b>Core</b>		
<i>All core units must be completed.</i>		
Fundamental pathways units	NWP103B	Demonstrate care and safe practices
	NWP104B	Sample and test water sources and quality
<b>Electives</b>		
<i>Three elective units must be completed.</i>		
At least two units must be completed from the electives shown below.		
One unit may be drawn from this Training Package at Certificate II level or another endorsed Training Package or Accredited Course at Certificate I or II level.		
Water Industry Operations	NWP105B	Draw and use simple maps, plans and drawings
From Certificate I in Business Services Training Package	BSBLED101A	Plan skills development
From Certificate II in Business Services Training Package	BSBWOR204A	Use business technology
	BSBITU201A	Produce simple word processed documents
	BSBITU202A	Create and use spreadsheets

## **NWP20107 Certificate II in Water Operations**

### **Modification History**

Not applicable.

### **Description**

To achieve this qualification the candidate must demonstrate competency in 11 units of competency, comprising three core and eight elective units.

### **Pathways Information**

Not applicable.

### **Licensing/Regulatory Information**

Not applicable.

### **Entry Requirements**

Not applicable.

## Employability Skills Summary

### Employability Skills Qualification Summary

**Qualification code:** NWP20107

**Qualification title:** Certificate II in Water Operations

The following table contains a summary of the employability skills as identified by the water industry for this qualification. The employability skills facets described here are broad industry requirements that may vary depending on qualification packaging options.

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Communication</b>	<ul style="list-style-type: none"> <li>• communicates effectively with internal and external customers</li> <li>• records and relays relevant information</li> <li>• understands and uses relevant definitions, terminology, symbols and language</li> <li>• interprets plans, drawings and specifications</li> <li>• participates in the implementation and monitoring of OHS policies and procedures</li> <li>• follows reporting procedures for monitoring conformity with statutory requirements</li> <li>• records and reports work activities</li> <li>• produces basic reports and logs</li> <li>• operates communications equipment</li> <li>• gives and receives instructions</li> <li>• follows plans, charts and instructions</li> <li>• understands a range of technical documents, including:               <ul style="list-style-type: none"> <li>• specifications</li> <li>• plans</li> <li>• organisational policies</li> <li>• service requirements specified in customer contracts</li> </ul> </li> <li>• discusses organisational issues</li> <li>• reports and records hazards and risks</li> <li>• maintains and checks records and documents</li> </ul>

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Teamwork</b>	<ul style="list-style-type: none"> <li>• works collaboratively and effectively with team members and contractors</li> <li>• describes the organisation's management structure and role relationships</li> <li>• gives and receives instructions</li> <li>• works effectively as part of a team</li> <li>• monitors work processes and ensures safe work practices</li> <li>• applies work procedures accurately and in a timely manner</li> <li>• checks coordination issues, including permission to access third-party sites, isolations and permits to work with relevant personnel</li> <li>• relates positively to fellow workers and the management team</li> </ul>
<b>Problem solving</b>	<ul style="list-style-type: none"> <li>• responds effectively to hazards, risks and emergencies</li> <li>• conducts relevant tests and monitoring procedures</li> <li>• assesses environmental risks at the local work site</li> <li>• applies control procedures to environmental risks and incidents</li> <li>• inspects water facilities (e.g. dams, distribution systems and treatment facilities) to identify actual or potential problems</li> <li>• analyses problems and applies appropriate remedial solutions</li> <li>• performs relevant calculations</li> <li>• collects and tests samples</li> <li>• restores sites after work</li> <li>• rectifies equipment faults</li> </ul>
<b>Initiative and enterprise</b>	<ul style="list-style-type: none"> <li>• identifies risks and hazards</li> <li>• contributes to improvements in environmental procedures</li> <li>• identifies typical faults and problems and takes necessary remedial action</li> <li>• identifies opportunities for improved water management</li> <li>• accesses, interprets and applies relevant legislative responsibilities</li> </ul>



<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Planning and organising</b>	<ul style="list-style-type: none"> <li>• plans and organises personal work activities</li> <li>• plans activities, incorporating appropriate control measures to overcome identified risks and meet required environmental outcomes for specific project or site</li> <li>• confirms testing details and plans testing work according to organisational and statutory requirements</li> <li>• conducts and assesses relevant water tests</li> <li>• contributes to effective management of water operation's assets</li> <li>• identifies and responds to problems experienced in assignments and projects</li> </ul>
<b>Self management</b>	<ul style="list-style-type: none"> <li>• plans performance to ensure required levels of service standards and work quality</li> <li>• interprets work requirements</li> <li>• monitors and adjusts work according to requirements for job quality, customer service, public responsibility and resource use</li> <li>• checks, edits, saves, prints and files work according to organisational requirements</li> <li>• reviews and applies standard reporting procedures and identifies impact on work</li> <li>• follows work instructions</li> <li>• finalises work and completes documentation</li> <li>• uses feedback to improve own performance</li> </ul>
<b>Learning</b>	<ul style="list-style-type: none"> <li>• seeks and applies feedback on personal performance</li> <li>• uses information effectively to improve work performance</li> <li>• learns from colleagues as part of effective teamwork</li> <li>• responds to suggestions for improvement to personal work performance</li> <li>• seeks advice and assistance from designated organisational personnel in operating computer systems</li> <li>• monitors and adjusts according to requirements for job quality, customer service, public responsibility and resource use</li> </ul>

Employability Skill	Industry/enterprise requirements for this qualification include the following facets:
<b>Technology</b>	<ul style="list-style-type: none"> <li>• knows procedures for the use of instruments and other field-testing equipment</li> <li>• prepares and checks testing equipment according to organisational and statutory requirements</li> <li>• applies relevant technologies used to gather, record and monitor, map and plan data</li> <li>• installs and maintains basic metering equipment, and flow control and regulating devices for irrigation systems</li> <li>• selects and uses suitable equipment according to the specific tasks and projects</li> <li>• reads meters</li> <li>• uses test equipment</li> <li>• uses workplace computer equipment</li> <li>• maintains and understands plant, equipment and tools' capabilities and limitations</li> <li>• uses technology to improve efficiency and effectiveness of managing work</li> </ul>

The high proportion of electives required by this qualification means that the facets of the above employability skills are representative of the water industry in general and may not reflect specific job roles. Learning and assessment strategies for this qualification should be based on the requirements identified in units of competency that meet packaging guidelines. This table is a summary of employability skills that are typical of this qualification and should not be interpreted as definitive.

## Packaging Rules

<p><b>Core</b></p> <p><i>All core units must be completed.</i></p>	
NWP201B	Follow defined OHS procedures and regulatory requirements
NWP202B	Apply environmental and licensing procedures
NWP203B	Plan and organise personal work activities
<p><b>Electives</b></p> <p><i>Eight elective units must be completed.</i></p> <p>The elective units must comprise at least five and up to eight electives drawn from the elective pool below.</p>	

**Core**

*All core units must be completed.*

The balance of units required to complete the qualification may be selected according to the following rules.

A maximum of three units may be drawn from Certificate III level in this Training Package.

A maximum of three units may be drawn from another endorsed Training Package or Accredited Course at Certificate II or III levels.

NWP207A	Work effectively in the water industry
NWP208A	Perform basic wastewater tests
NWP209B	Use maps, plans, drawings and specifications
NWP210B	Perform basic water quality tests
NWP211B	Use computerised systems
NWP213B	Monitor and operate irrigation and domestic delivery systems
NWP215B	Install and replace basic volumetric metering equipment
NWP216B	Install basic metering equipment and flow control devices for irrigation systems
NWP218B	Perform and record sampling
NWP219A	Work safely in confined spaces
NWP220B	Collect and control drainage run-off
NWP221A	Operate basic flow control and regulating devices in water or wastewater treatment network systems
NWP222A	Operate basic flow control and regulating devices in irrigation systems
NWP223A	Install basic metering equipment, flow control and regulating devices
NWP226B	Prepare and restore work site
NWP227B	Control vegetation on a site
NWP229B	Repair minor structures
NWP230B	Maintain and repair irrigation channels and drains

<b>Core</b>	
<i>All core units must be completed.</i>	
NWP231B	Maintain and repair drainage assets
NWP232B	Operate water reticulation and distribution system
NWP233B	Construct and install water distribution assets
NWP234B	Locate, identify and protect utility services
NWP239B	Identify and apply water entitlements and delivery processes
NWP240B	Inspect and report catchment and surrounding areas
NWP241B	Inspect and maintain basic dams and water storages
NWP242B	Monitor and report water extraction
NWP243B	Operate bore fields and groundwater source systems
NWP244B	Maintain and repair bulkwater assets
NWP245B	Maintain tanks and water storage assets
NWP246B	Inspect and maintain public facilities
NWP247A	Maintain catchment and surrounding areas
NWP250B	Construct and install wastewater pipelines
NWP251B	Construct open earthen channels or drains
NWP252B	Construct and install irrigation delivery and stormwater drainage assets
NWP253B	Install and repair water services
NWP254B	Repair or insert water distribution assets
NWP255B	Maintain and repair wastewater collection assets
NWP256B	Monitor and report water distribution systems
NWP257B	Maintain and repair wastewater collection systems
NWP258B	Monitor and operate bulkwater transfer systems
NWP259B	Operate, monitor and maintain pump stations

<b>Core</b>	
<i>All core units must be completed.</i>	
NWP260A	Monitor and report water treatment processes
NWP261A	Operate and maintain water treatment plant and equipment
NWP262A	Monitor and report wastewater treatment processes
NWP263A	Operate and maintain wastewater treatment plant and equipment
NWP264B	Monitor, operate and report wastewater pre-treatment processes
NWP268B	Monitor, operate and report chlorine disinfection systems
NWP270B	Monitor, operate and report basic anaerobic processes
NWP271B	Monitor, operate and report sedimentation processes
NWP272B	Monitor, operate and report wastewater lagoon processes
NWP273A	Monitor, operate and report ultraviolet irradiation disinfection systems
NWP274A	Monitor, operate and report ozone treatment systems
NWP275A	Monitor, operate and report chlorine dioxide systems
NWP276A	Monitor, operate and report fluoridation systems
NWP277A	Work safely with liquefied chlorine gas
NWP278A	Perform blue green algae sampling
RIICCM205A	Carry out manual excavation
RIICCM210A	Install trench support

## **NWP30107 Certificate III in Water Operations**

### **Modification History**

Not applicable.

### **Description**

To achieve this qualification the candidate must demonstrate competency in 11 units of competency, comprising three core and eight elective units.

### **Pathways Information**

Not applicable.

### **Licensing/Regulatory Information**

Not applicable.

### **Entry Requirements**

Not applicable.

## Employability Skills Summary

### Employability Skills Qualification Summary

**Qualification code:** NWP30107

**Qualification title:** Certificate III in Water Operations

The following table contains a summary of the employability skills as identified by the water industry for this qualification. The employability skills facets described here are broad industry requirements that may vary depending on qualification packaging options.

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Communication</b>	<ul style="list-style-type: none"> <li>• communicates effectively and appropriately with customers, colleagues and contractors</li> <li>• communicates effectively in a diverse workforce</li> <li>• negotiates and resolves disputes and minimises customer concerns</li> <li>• uses complex communication techniques, including:                             <ul style="list-style-type: none"> <li>• verbal and non-verbal language</li> <li>• two-way interaction</li> <li>• constructive feedback</li> <li>• active listening</li> <li>• questioning to clarify and confirm understanding</li> <li>• interpreting verbal and non-verbal messages</li> <li>• observation techniques</li> </ul> </li> <li>• uses positive, confident and cooperative language</li> <li>• controls tone of voice and body language</li> <li>• uses language and concepts appropriate to cultural differences</li> <li>• clear presents options and consequences</li> <li>• demonstrates flexibility and willingness to negotiate</li> <li>• communicates OHS policies and procedures</li> <li>• communicates environmental plans and procedures within the workplace</li> <li>• understands and interprets a range of technical documents, including relevant:                             <ul style="list-style-type: none"> <li>• regulatory, legislative, licensing and organisational requirements</li> <li>• codes and standards</li> <li>• plans</li> <li>• specifications</li> <li>• organisational policies</li> </ul> </li> <li>• understands relevant definitions, terminology, symbols and language</li> <li>• discusses organisational issues</li> <li>• reports and records hazards and risks</li> <li>• participates in ensuring compliance with standards, regulations and policies</li> <li>• maintains calibration records and certificates according to</li> </ul>

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
	<ul style="list-style-type: none"> <li>organisational and statutory requirements</li> <li>• collects and analyses data on system performance and usage and reports according to organisational requirements</li> <li>• prepares clear and concise reports for use in court proceedings according to stakeholder and organisational requirements</li> <li>• maintains and checks records and documents</li> </ul>
<b>Teamwork</b>	<ul style="list-style-type: none"> <li>• works collaboratively and effectively with team members and contractors</li> <li>• participates in regular reviews of environmental procedures</li> <li>• uses resources to undertake team tasks and meet customer service levels</li> <li>• refers customer concerns related to organisational liability to appropriate persons or departments according to organisational policy</li> <li>• monitors work processes and ensures safe work practices</li> <li>• contributes to the development, refinement and improvement of organisational quality service policies and standards</li> <li>• relates positively to fellow workers and the management team</li> </ul>
<b>Problem solving</b>	<ul style="list-style-type: none"> <li>• responds effectively to hazards, risks and emergencies</li> <li>• conducts relevant tests and monitoring procedures</li> <li>• inspects water facilities (e.g. dams, distribution systems and treatment facilities) to identify actual or potential problems</li> <li>• takes steps to resolve customer concerns or complaints according to organisational policies and procedures</li> <li>• analyses problems and applies appropriate remedial solutions</li> <li>• controls and integrates processes to maintain and optimise operating parameters</li> <li>• detects faults in operational condition of system and network</li> <li>• performs various calculations</li> <li>• rectifies equipment faults</li> </ul>



<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Initiative and enterprise</b>	<ul style="list-style-type: none"> <li>• identifies risks and hazards</li> <li>• identifies typical faults and problems and takes necessary remedial action</li> <li>• applies knowledge of the effects of weather and conditions on operation of collection and transfer systems</li> <li>• identifies opportunities for improved water management</li> <li>• proactively implements effective customer service strategies and tactics</li> </ul>
<b>Planning and organising</b>	<ul style="list-style-type: none"> <li>• participates in effective implementation of organisation's operational plans</li> <li>• monitors and assesses relevant water tests</li> <li>• investigates water quality problems and investigates the causes according to organisational and statutory requirements</li> <li>• contributes to effective management of water operation's assets</li> <li>• installs and commissions new assets and equipment</li> </ul>
<b>Self management</b>	<ul style="list-style-type: none"> <li>• manages own performance to ensure required levels of service standards, work quality and professional competence</li> <li>• manages work priorities</li> <li>• plans and applies team and work activities to meet customer satisfaction and minimise inconvenience</li> <li>• uses feedback to improve own performance</li> </ul>
<b>Learning</b>	<ul style="list-style-type: none"> <li>• seeks feedback on personal performance</li> <li>• uses information effectively to improve work performance</li> <li>• learns from colleagues as part of effective teamwork</li> <li>• reviews personal work performance to identify opportunities to improve service provision to customers</li> <li>• identifies opportunities to improve services or processes and communicates them to colleagues</li> </ul>

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• reads meters</li> <li>• uses water management equipment, including:               <ul style="list-style-type: none"> <li>• pipes and fittings</li> <li>• gravity systems</li> <li>• pumping and valving systems</li> <li>• control systems</li> <li>• system hydraulics</li> </ul> </li> <li>• uses workplace computer equipment</li> <li>• maintains and understands capabilities and limitations of plant, equipment and tools</li> <li>• conducts maintenance on devices and equipment</li> <li>• uses technology to improve efficiency and effectiveness of managing work</li> </ul>

The high proportion of electives required by this qualification means that the facets of the above employability skills are representative of the water industry in general and may not reflect specific job roles. Learning and assessment strategies for this qualification should be based on the requirements as identified in units of competency that meet packaging guidelines. This table is a summary of employability skills that are typical of this qualification and should not be interpreted as definitive.

## Packaging Rules

<p><b>Core</b></p> <p><i>All units must be completed.</i></p>	
NWP301B	Implement, monitor and coordinate environmental procedures
BSBWOR301A	Organise personal work priorities and development
BSBOHS303A	Contribute to OHS hazard identification and risk assessment
<p><b>Electives</b></p> <p><i>Eight elective units must be completed.</i></p> <p>The elective units must comprise at least four and up to eight electives drawn from the elective pool below.</p> <p>The balance of units required to complete the qualification may be selected according to the following rules.</p>	

<b>Core</b>	
<i>All units must be completed.</i>	
A maximum of three water industry specific elective units (coded NWP) may be drawn from the Certificate II in this Training Package.	
A maximum of three units may be drawn from this Training Package at Certificate IV level.	
A maximum of three units may be drawn from another endorsed Training Package or Accredited Course at Certificate III or IV levels.	
NWP300B	Provide and promote customer service
NWP302A	Install meters for non-potable, non-urban water supplies
NWP303A	Monitor and control maintenance of water and wastewater system assets
NWP304A	Maintain meters for non-potable, non-urban water supplies
NWP305B	Monitor and conduct minor maintenance of complex flow-control and metering devices
NWP308B	Test and commission wastewater collection systems
NWP309B	Test and commission water distribution systems
NWP310B	Monitor and operate water distribution systems
NWP311B	Monitor and operate wastewater collection and transfer systems
NWP315B	Investigate and report breaches of water industry legislation
NWP316B	Monitor and schedule water deliveries
NWP317B	Control water quality in distribution systems
NWP318A	Monitor and operate gated spillways
NWP319A	Monitor and control dam operations
NWP320B	Monitor and implement dam maintenance
NWP321B	Inspect and operate groundwater regulation
NWP322B	Inspect and operate surface water systems
NWP323B	Monitor and coordinate catchment operations

<b>Core</b>	
<i>All units must be completed.</i>	
NWP324B	Inspect and report river regulation operations
NWP326A	Conduct and report dam safety instrumentation monitoring
NWP327A	Inspect and report on concrete dam safety
NWP328A	Inspect and report on embankment dam safety
NWP330B	Establish positions of underground utilities using locating devices
NWP331B	Inspect conduit and report on condition and features
NWP332B	Monitor, operate and control drainage operations
NWP333B	Monitor and control rural water distribution operations
NWP338B	Perform odour and infiltration investigations
NWP339B	Perform leak detection
NWP340A	Measure and process hydrometric stream discharge data using wading gaugings
NWP341A	Install and maintain hydrometric instruments and equipment
NWP342A	Commission, decommission and monitor hydrometric sites, stations and facilities
NWP345B	Monitor, operate and control water treatment processes
NWP346B	Monitor, operate and control wastewater treatment processes
NWP347B	Monitor, operate and control coagulation and flocculation processes
NWP348B	Monitor, operate and control sedimentation and clarification processes
NWP349B	Monitor operate and control incineration processes
NWP350B	Monitor, operate and control aerobic bioreactor processes
NWP351B	Monitor, operate and control activated sludge processes

<b>Core</b>	
<i>All units must be completed.</i>	
NWP352B	Monitor, operate and control dissolved air flotation processes
NWP353B	Monitor, operate and control anaerobic bioreactor processes
NWP354B	Monitor, operate and control granular media filtration processes
NWP355B	Monitor, operate and control membrane filtration processes
NWP356B	Monitor, operate and control ion exchange processes
NWP357B	Monitor, operate and control reverse osmosis and nano filtration processes
NWP359B	Monitor, operate and control nutrient removal processes
NWP360B	Monitor, operate and control dewatering processes
NWP361B	Monitor, operate and control gas scrubber treatment processes
NWP362B	Monitor, operate and control reclaimed water irrigation
NWP363B	Monitor performance and control maintenance of treatment plant assets
NWP364B	Perform laboratory testing
NWP365A	Identify and confirm blue green algae outbreaks
NWP366A	Monitor, operate and control chloramination disinfection processes
NWP367A	Monitor, operate and control activated carbon adsorption processes
NWP368A	Respond to blue green algae incidents
LGAWORK405A	Plan and supervise roadworks
LGAWORK406A	Supervise concrete works

## **NWP40107 Certificate IV in Water Operations**

### **Modification History**

Not applicable.

### **Description**

The Certificate IV in Water Operations supports candidates seeking competency and requiring increasingly specialised technical skills or those who require a broad range of skills.

To achieve this qualification the candidate must demonstrate competency in nine units, comprising two core and seven elective units of competency.

### **Pathways Information**

Not applicable.

### **Licensing/Regulatory Information**

Not applicable.

### **Entry Requirements**

Not applicable.

## Employability Skills Summary

### Employability Skills Qualification Summary

**Qualification code:** NWP40107

**Qualification title:** Certificate IV in Water Operations

The following table contains a summary of the employability skills as identified by the water industry for this qualification. The employability skills facets described here are broad industry requirements that may vary depending on qualification packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include the following facets:
<b>Communication</b>	<ul style="list-style-type: none"> <li>• communicates OHS policies and procedures</li> <li>• communicates environmental plans and procedures within the workplace</li> <li>• communicates effectively with customers</li> <li>• interprets a range of complex and technical documents, including relevant:               <ul style="list-style-type: none"> <li>• regulatory, legislative, licensing and organisational requirements</li> <li>• codes and standards</li> <li>• specifications</li> <li>• organisational policies</li> </ul> </li> <li>• understands relevant definitions, terminology, symbols and language</li> <li>• discusses organisational issues</li> <li>• reports and records hazards and risks</li> <li>• participates in ensuring compliance with standards, regulations and policies</li> <li>• maintains and checks records and documents</li> <li>• communicates effectively with a range of relevant parties</li> <li>• articulates complex ideas clearly</li> <li>• analyses and evaluates reports and reference materials</li> </ul>

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Teamwork</b>	<ul style="list-style-type: none"> <li>• demonstrates leadership within work teams</li> <li>• conducts briefing with team members</li> <li>• collaboratively and effectively implements operational plans</li> <li>• works collaboratively with relevant stakeholders</li> <li>• supervises and checks others' work, monitors work processes and ensures safe work practices</li> <li>• verifies competence of operators undertaking inspections</li> <li>• coordinates a range of team members and activities</li> <li>• ensures that relevant workforce participates in reviews of environmental procedures and prepares reports according to organisational procedures</li> <li>• relates positively to fellow workers and the management team</li> </ul>
<b>Problem solving</b>	<ul style="list-style-type: none"> <li>• responds effectively to hazards, risks and emergencies</li> <li>• oversees processes within the water industry to ensure the effective and continuous provision of water services</li> <li>• analyses problems and applies appropriate remedial solutions</li> <li>• performs various calculations to provide data for the analysis and development of options and solutions</li> <li>• monitors assets to ensure performance meets specifications in management plans</li> <li>• identifies and rectifies faults</li> <li>• identifies links between operational problems and maintenance activities</li> <li>• identifies hazards and develops appropriate responses to control and mitigate risks in accordance with regulations and legislation</li> </ul>
<b>Initiative and enterprise</b>	<ul style="list-style-type: none"> <li>• proactively implements effective customer service strategies and tactics</li> <li>• identifies risks and hazards</li> <li>• identifies typical faults and problems and takes necessary remedial action</li> <li>• investigates breaches of contracts</li> <li>• develops and checks contingency plans for new types of industries or processes</li> <li>• establishes processes to identify and report non-compliance</li> <li>• identifies opportunities for improved water management</li> </ul>



<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Planning and organising</b>	<ul style="list-style-type: none"> <li>• participates in effective implementation of organisation's operational plans</li> <li>• schedules activities to meet current and potential problems</li> <li>• participates in and coordinates elements of effective delivery of services</li> <li>• participates in the provision of appropriate information to inform workplace processes</li> <li>• monitors and assesses relevant water tests</li> <li>• contributes to the management of workplace contracts</li> </ul>
<b>Self management</b>	<ul style="list-style-type: none"> <li>• manages own performance to ensure required levels of service standards, work quality and professional competence</li> <li>• manages work priorities</li> <li>• monitors assets to ensure that progress follows plans</li> <li>• uses feedback to improve own performance</li> </ul>
<b>Learning</b>	<ul style="list-style-type: none"> <li>• seeks feedback on personal performance</li> <li>• uses information effectively to improve work performance</li> <li>• learns from colleagues as part of effective teamwork</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• reads meters</li> <li>• monitors water management equipment</li> <li>• uses relevant computer equipment</li> <li>• maintains and understands capabilities and limitations of plant, equipment and tools</li> <li>• uses technology to improve efficiency and effectiveness of managing work</li> </ul>

The high proportion of electives required by this qualification means that the facets of the above employability skills are representative of the water industry in general and may not reflect specific job roles. Learning and assessment strategies for this qualification should be based on the requirements as identified in units of competency that meet packaging guidelines. This table is a summary of employability skills that are typical of this qualification and should not be interpreted as definitive.

## Packaging Rules

<b>Core</b>	
<i>All core units must be completed.</i>	
LGACOM405B	Implement and monitor the organisation's OHS policies, procedures and programs within the work group
NWP401B	Coordinate and monitor the application of environmental plans and procedures
<b>Electives</b>	
<i>Seven elective units must be completed.</i>	
The elective units must comprise at least three and up to seven elective units of competency drawn from the elective pool below.	
The balance of units required to complete the qualification may be selected according to the following rules.	
A maximum of two water industry specific elective units (coded NWP) may be drawn from the Certificate III level in this Training Package.	
A maximum of three units may be drawn from this Training Package at Diploma level.	
A maximum of three units may be drawn from another endorsed Training Package or Accredited Course at Certificate IV or Diploma levels.	
NWP219A	Work safely in confined spaces
NWP403A	Investigate and plan the optimisation of potable water distribution systems
NWP404A	Apply principles of chemistry to water systems and processes
NWP406A	Investigate and plan the optimisation of granular media filtration processes
NWP407A	Investigate and plan the optimisation of dissolved air flotation processes
NWP408A	Investigate and plan the optimisation of sedimentation and clarification processes
NWP409A	Investigate and plan to optimise the operation of chemical addition processes
NWP410C	Coordinate and monitor asset construction and maintenance
NWP411A	Select treatment requirements for waterborne

<b>Core</b>	
<i>All core units must be completed.</i>	
	microorganisms
NWP412A	Investigate and plan the optimisation of activated sludge processes
NWP413A	Investigate and plan the optimisation of anaerobic treatment processes
NWP414A	Select strategies to control microbial impact on wastewater treatment processes
NWP415B	Coordinate and monitor surface water systems
NWP416B	Coordinate and monitor water storage catchment activities
NWP417B	Coordinate and monitor groundwater system usage
NWP418B	Coordinate and monitor bulkwater system operations
NWP419B	Coordinate and monitor river system usage
NWP420A	Install, operate and maintain hydrologic instruments and equipment
NWP421A	Collect, measure and process hydrometric stream discharge gauging
NWP425B	Coordinate and monitor the operation of irrigation delivery systems
NWP427B	Coordinate and monitor the operation of drainage systems
NWP428B	Coordinate and monitor the operation of wastewater collection systems
NWP429B	Coordinate, implement and report trade waste monitoring procedures
NWP430A	Evaluate, implement and monitor standard low-risk trade waste discharge approvals
NWP431A	Investigate, rectify and report on trade waste incidents
NWP432A	Contribute to the continuous improvement of quality systems

<b>Core</b>	
<i>All core units must be completed.</i>	
NWP440A	Supervise conduit inspection and reporting
LGAWORK404A	Manage a civil works project
PSPPROC414A	Manage contracts
MEM30027A	Prepare basic programs for programmable logic controllers
MSACMT461A	Facilitate SCADA systems in a manufacturing team or work area
RTD3507A	Undertake sampling and testing of water
BSBWOR404A	Develop work priorities
BSBMGT402A	Implement operational plan

## **NWP50107 Diploma of Water Operations**

### **Modification History**

Not applicable.

### **Description**

The Diploma of Water Operations supports candidates seeking competency and requiring increasingly specialised technical skills or those who require a broad range of skills.

To achieve this qualification the candidate must demonstrate competency in seven units, comprising two core and five elective units of competency.

### **Pathways Information**

Not applicable.

### **Licensing/Regulatory Information**

Not applicable.

### **Entry Requirements**

Not applicable.

## Employability Skills Summary

### Employability Skills Qualification Summary

**Qualification code:** NWP50107

**Qualification title:** Diploma of Water Operations

The following table contains a summary of the employability skills as identified by the water industry for this qualification. The employability skills facets described here are broad industry requirements that may vary depending on qualification packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include the following facets:
<b>Communication</b>	<ul style="list-style-type: none"> <li>• communicates the development, implementation and maintenance of:               <ul style="list-style-type: none"> <li>• OHS policies and procedures</li> <li>• environmental policies and procedures</li> <li>• a range of relevant water management policies and procedures</li> </ul> </li> <li>• communicates effectively with a range of people, including staff, contractors and customers</li> <li>• interprets a range of complex and technical documents, including relevant:               <ul style="list-style-type: none"> <li>• regulatory, legislative, licensing and organisational requirements</li> <li>• codes and standards</li> </ul> </li> <li>• develops and communicates a range of complex and technical documents, including relevant:               <ul style="list-style-type: none"> <li>• specifications</li> <li>• organisational policies and procedures</li> </ul> </li> <li>• understands relevant definitions, terminology, symbols and language</li> <li>• discusses organisational issues</li> <li>• conducts community consultation</li> <li>• reports and records hazards and risks</li> <li>• takes a leadership role in ensuring workforce compliance with standards, regulations and policies</li> <li>• maintains and checks records and documents</li> <li>• articulates complex ideas clearly</li> <li>• analyses and evaluates reports and reference materials</li> </ul>

<b>Teamwork</b>	<ul style="list-style-type: none"> <li>• demonstrates leadership within work teams and business units</li> <li>• collaboratively and effectively develops and implements operational plans</li> <li>• works collaboratively with relevant stakeholders</li> <li>• defines and explains responsibilities and accountabilities</li> <li>• supervises and checks others' work, monitors work processes and ensures safe work practices</li> <li>• facilitates production of and produces workplace documentation that ensures effective workforce performance</li> <li>• coordinates a range of team members and activities</li> <li>• relates positively to fellow workers and the management team</li> </ul>
<b>Problem solving</b>	<ul style="list-style-type: none"> <li>• responds effectively to hazards, risks and emergencies</li> <li>• develops plans geared to minimising risks and hazards</li> <li>• collates, manipulates and interprets data</li> <li>• applies techniques for flood estimation to flood estimation guidelines</li> <li>• conducts consultations</li> <li>• oversees processes within the water industry to ensure the effective and continuous provision of water services</li> <li>• analyses problems and applies appropriate remedial solutions</li> <li>• uses and analyses complex data in decision making</li> </ul>
<b>Initiative and enterprise</b>	<ul style="list-style-type: none"> <li>• proactively manages and supervises effective customer service strategies and tactics</li> <li>• establishes best practice procedures for the implementation of management plans</li> <li>• identifies work processes and practices to improve organisational performance</li> <li>• recommends changes to plan objectives and operational procedures</li> <li>• defines and quantifies responsibilities and accountabilities</li> <li>• identifies complex faults and problems and takes necessary remedial action</li> <li>• considers information about known impacts, risk assessments and control procedures in preparing plans</li> <li>• modifies policies and plans to incorporate identified and required changes</li> <li>• identifies opportunities for improved water management</li> </ul>

<b>Planning and organising</b>	<ul style="list-style-type: none"> <li>• leads effective implementation of organisation's operational plans</li> <li>• plans and participates in effective delivery of services</li> <li>• plans processes</li> <li>• develops and checks contingency plans for new types of industries or processes</li> <li>• incorporates issues identified by reviews and audits into management plan</li> <li>• prepares and presents management policies and plans</li> <li>• reviews management policies against objectives, policies and plans</li> <li>• implements emergency action plans according to management plans</li> <li>• monitors activities to ensure compliance with approvals</li> <li>• prepares and plans for trade waste management</li> <li>• schedules and conducts on-site inspections</li> <li>• manages workplace contracts</li> </ul>
<b>Self management</b>	<ul style="list-style-type: none"> <li>• manages own performance to ensure required levels of service standards, work quality and professional competence</li> <li>• manages work priorities</li> <li>• identifies and recommends opportunities for performance improvements according to management plans</li> <li>• reviews objectives of the management and implementation plans</li> <li>• defines and quantifies responsibilities and accountabilities</li> <li>• uses feedback to improve own performance</li> </ul>
<b>Learning</b>	<ul style="list-style-type: none"> <li>• seeks feedback on personal performance</li> <li>• uses information effectively to improve work performance</li> <li>• identifies and assesses legislative, organisational and environmental requirements that impact on work system</li> <li>• regularly reviews and assesses records to identify long-term trends and impacts</li> <li>• learns from colleagues as part of effective teamwork</li> </ul>



<b>Technology</b>	<ul style="list-style-type: none"> <li>• uses IT systems to manage and communicate planning process</li> <li>• uses complex water system management technology</li> <li>• models simulated, hypothetical or estimated rainfall intensity data and catchment characteristics</li> <li>• understands capabilities and limitations of organisation's plant, equipment and tools</li> <li>• uses technology to improve efficiency and effectiveness of managing work</li> </ul>
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The high proportion of electives required by this qualification means that the facets of the above employability skills are representative of the water industry in general and may not reflect specific job roles. Learning and assessment strategies for this qualification should be based on the requirements as identified in units of competency that meet packaging guidelines. This table is a summary of employability skills that are typical of this qualification and should not be interpreted as definitive.

## Packaging Rules

<b>Core</b>	
<i>The following two core units must be completed.</i>	
PSPSOHS501A	Participate in the coordination and maintenance of a systematic approach to managing OHS
NWP505B	Implement and monitor environmental management policies, plans, procedures and programs
<b>Electives</b>	
<i>Five elective units must be completed.</i>	
The elective units must comprise at least three and up to five elective units drawn from the elective pool below.	
The balance of units required to complete the qualification may be selected according to the following rules.	
A maximum of two water industry specific elective units (coded NWP) may be drawn from the Certificate IV level in this Training Package.	
A maximum of one relevant unit may be drawn from another endorsed Training Package at Certificate IV level.	
A maximum of two relevant units may be drawn from another endorsed Training Package or Accredited Course at Diploma level.	
NWP504A	Collect and manage hydrometric station survey data

<b>Core</b>	
<i>The following two core units must be completed.</i>	
NWP508A	Apply principles of hydraulics to pipe and channel flow
NWP509A	Collect, verify and report hydrometric time series data
NWP510A	Develop and maintain ratings
NWP511B	Manage large dam safety surveillance
NWP512B	Implement and manage catchment management plan
NWP513B	Develop and review catchment management plan
NWP514B	Implement and manage groundwater management plan
NWP515B	Develop and review groundwater management plan
NWP516B	Implement and manage surface water management plan
NWP517B	Develop and review surface water management plan
NWP518B	Prepare and report on data related to flood mitigation
NWP519B	Develop and report flood mitigation
NWP520A	Contribute to hydrometric planning and water resource management
NWP525B	Implement and manage asset construction and maintenance
NWP527B	Conduct commissioning and post-commissioning activities
NWP528B	Implement and manage trade waste policies and plans
NWP529B	Develop and modify trade waste management policies and plans
NWP530B	Implement and manage the operation and maintenance of irrigation delivery systems
NWP531B	Develop and review irrigation system management plan
NWP532B	Implement and manage potable water system management plan
NWP533B	Develop and review potable water system management

<b>Core</b>	
<i>The following two core units must be completed.</i>	
	plan
NWP534B	Implement and manage drainage system management plan
NWP535B	Develop and review drainage system management plan
NWP536B	Implement and manage wastewater collection management plan
NWP537B	Develop and review wastewater collection management plan
NWP545B	Implement and manage water treatment processes monitoring program
NWP546B	Develop and review water treatment processes management plan
NWP547B	Implement and manage wastewater treatment processes monitoring program
NWP548B	Develop and review wastewater treatment management plan
NWP551A	Evaluate, implement and monitor high-risk trade waste discharge approvals
LGAWORK501A	Prepare preliminary design for operational works
LGAWORK502A	Prepare detailed works project documentation
LGAWORK503A	Undertake project investigation
PSPPROC506A	Plan to manage contracts
BSBMGT515B	Manage operational plan
BSBFIM501A	Manage budgets and financial plans
CPPSIS4002A	Store and retrieve spatial data
CPPSIS5002A	Capture new spatial data
CPPSIS5010A	Collate and interpret spatial data



## **Modification History**

Not applicable.

## **Description**

The Vocational Graduate Certificate in Water Industry Leadership supports graduate entrants to the water industry who require industry-specific context to add to their broad academic education gained in, for example, engineering, applied science or chemistry. It also supports experienced existing workers seeking to extend their career opportunities.

## **Pathways Information**

Not applicable.

## **Licensing/Regulatory Information**

Not applicable.

## **Entry Requirements**

Not applicable.

## Employability Skills Summary

### Employability Skills Qualification Summary

**Qualification code:** NWP70107

**Qualification title:** Vocational Graduate Certificate in Water Industry Leadership

The following table contains a summary of the employability skills as identified by the water industry for this qualification. The employability skills facets described here are broad industry requirements that may vary depending on qualification packaging options.

Employability Skill	Industry/enterprise requirements for this qualification include the following facets:
<b>Communication</b>	<ul style="list-style-type: none"> <li>• communicates development, implementation and maintenance of policy, processes and strategy within the water organisation</li> <li>• communicates effectively with staff, contractors and customers</li> <li>• interprets a range of complex and technical documents, including relevant:               <ul style="list-style-type: none"> <li>• regulatory, legislative, licensing and organisational requirements</li> <li>• codes and standards</li> </ul> </li> <li>• discusses and advocates organisational issues</li> <li>• communicates compliance and reporting information to team members</li> <li>• takes a leadership role in ensuring workforce compliance with standards, regulations and policies</li> <li>• articulates complex ideas clearly</li> <li>• analyses and evaluates reports and reference materials</li> </ul>
<b>Teamwork</b>	<ul style="list-style-type: none"> <li>• demonstrates leadership within work teams and business units</li> <li>• collaboratively and effectively develops, implements and oversees operational and strategic plans</li> <li>• works collaboratively with relevant stakeholders</li> <li>• plans, applies and monitors reporting processes</li> <li>• supervises and checks others' work, monitors work processes and ensures safe work practices</li> <li>• coordinates a range of team members and activities</li> <li>• relates positively to fellow workers and the management team</li> </ul>

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Problem solving</b>	<ul style="list-style-type: none"> <li>• analyses and identifies trends related to the management of water resources</li> <li>• leads organisational planning processes</li> <li>• analyses and reviews the capacity of relevant technology and applies it to the solving of problems</li> <li>• responds effectively to hazards, risks and emergencies</li> <li>• oversees processes within the water industry to ensure the effective and continuous provision of water services</li> <li>• analyses problems and applies appropriate remedial solutions</li> <li>• uses and analyses complex data in decision making</li> </ul>
<b>Initiative and enterprise</b>	<ul style="list-style-type: none"> <li>• develops strategies, policies and plans aimed at ensuring the sustainable use of water</li> <li>• conducts research to underpin the planning process</li> <li>• identifies work processes and practices to improve organisational performance</li> <li>• analyses the structure and challenges of the water industry</li> <li>• identifies complex faults and problems and takes necessary remedial action</li> <li>• identifies, pursues and promotes opportunities for improved water management</li> </ul>
<b>Planning and organising</b>	<ul style="list-style-type: none"> <li>• leads the effective development of high-level planning processes</li> <li>• plans and participates in the effective delivery of services</li> <li>• improves policies, plans and processes</li> <li>• plans for environmental sustainability</li> <li>• periodically reviews risk management or control plans and assesses them for their adequacy, timeliness and effectiveness in risk mitigation</li> <li>• undertakes evidence-based short, medium and long-range planning</li> <li>• plans processes</li> </ul>

<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include the following facets:</b>
<b>Self management</b>	<ul style="list-style-type: none"> <li>• manages own performance</li> <li>• manages work priorities</li> <li>• coordinates a range of tasks to ensure efficient completion</li> <li>• assesses project outcomes for compliance with required quality standards</li> <li>• negotiates required changes to project plans</li> <li>• develops risk management or control plans to eliminate or reduce the potential for risk events and consequences</li> <li>• uses feedback to improve own performance</li> </ul>
<b>Learning</b>	<ul style="list-style-type: none"> <li>• seeks feedback on organisational and work performance</li> <li>• identifies quality management methods, techniques and tools used to support project management</li> <li>• performs complex research to maintain currency of knowledge and practice</li> <li>• analyses technical and financial information</li> <li>• uses information effectively to improve work performance</li> <li>• identifies potential or actual operational problems</li> <li>• researches and interprets social trends</li> <li>• learns from colleagues as part of effective teamwork</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• uses IT systems to manage and communicate the planning process</li> <li>• uses complex water system management technology</li> <li>• understands capabilities and limitations of organisation's plant, equipment and tools</li> <li>• uses technology to improve efficiency and effectiveness of managing work</li> </ul>

The diverse nature of the roles undertaken by the candidates and the equally diverse nature of the experience they bring to the roles they are performing means that the facets of the above employability skills are representative of the water industry in general and may not reflect specific job roles. Learning and assessment strategies for this qualification should be based on the requirements as identified in units of competency that meet packaging guidelines. This table is a summary of employability skills that are typical of this qualification and should not be interpreted as definitive.

## Packaging Rules



To achieve this qualification the candidate must demonstrate competency in four of the units listed below.

<b>Unit code</b>	<b>Unit title</b>
NWP701A	Contribute to the development of a complex water organisation
NWP702A	Apply water industry legislation, codes and standards
NWP703A	Lead water planning processes
NWP704A	Lead a project development
NWP705A	Provide leadership in hydrometric network planning and water resource management
NWP706A	Review and evaluate water and wastewater sustainability objectives
NWP707A	Analyse and review water treatment plant technology

## **NWP101B Investigate sustainable water cycle management**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to understand the water cycle, sustainable water usage and the testing of water quality. The ability to understand the link between the services and systems of the water organisation and supply to, and usage by, the consumer is essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for new entrants to the industry or those who are preparing to enter the water industry workforce or undertaking assignment and field work related to water research. Successful completion of this unit would be facilitated by partnership with a water industry organisation. There are opportunities to integrate delivery and assessment of this unit with mainstream high school programs (mathematics, science, geography, physics, engineering and English).

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Identify water cycle and water systems.</b>	<p>1.1 Find out about and explain continuous cycle of evaporation and condensation that controls distribution of earth's water.</p> <p>1.2 Find out about and explain methods of capturing, storing and distributing water.</p> <p>1.3 Find out about and explain range of <i>water and waste systems</i> used to deliver services.</p> <p>1.4 Find out about and explain community's use of water services.</p> <p>1.5 Use <i>appropriate water industry terms</i> when communicating and reporting.</p>
<b>2 Identify sustainable water practices.</b>	<p>2.1 Identify and report ways for households to minimise water usage and increase available supply.</p> <p>2.2 Find out about and report ways for communities to minimise water usage and increase available supply.</p> <p>2.3 Find out about and report <i>ways to increase sources</i> of water supply.</p>
<b>3 Assess factors affecting water quality.</b>	<p>3.1 Identify bodies responsible for establishing and managing standards for water quality.</p> <p>3.2 Identify and explain characteristics, requirements and standards for drinking water.</p> <p>3.3 Identify and explain <i>environmental risks and impacts</i> to water services.</p> <p>3.4 Find out about and report methods and procedures used by water organisations to maintain water quality.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- research and interpret legal, social, community and environmental requirements and impact on water resource management
- identify system and infrastructure components of selected water systems
- identify agencies involved in water management
- identify environmental policies, plans and procedures
- use literacy skills for verbal and written communication in collaborating, research and reporting.

#### **Required knowledge:**

- legal, social, community and environmental requirements which apply to a selected water environment
- terminology applicable to water systems, water usage, water conservation and the water industry
- control procedures for environmental risks and incidents
- principally environmental impact assessment
- primary agencies involved in drinking water quality and environmental management
- water quality performance indicators
- overview of the water supply system
- water hazardous agents and preventative strategies
- community and agency roles and responsibilities in monitoring water quality
- recording methods.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to research and interpret the water cycle, sustainable water usage and the testing of water quality including:

- identifying and exploring the meaning of the water cycle and implications for community's use of water services
- identifying and exploring systems and customer services offered by water industry organisations
- identifying the factors which influence customer expectations and satisfaction
- identifying and exploring factors that can contribute to sustainable water practices within communities and households
- identifying and exploring strategies that can be employed to increase access to water resources
- exploring and communicating factors affecting water quality.

#### **Context of and specific resources for assessment**

Access to resources including:

- library, water enterprise information, information sources for research and investigation
- mentors, advisors and teachers able to guide and support research and investigation of water resource management
- guided visits to key locations associated with water resource management.

Access must be provided to appropriate learning and assessment support.

Assessment processes and techniques must take into account language, literacy and cultural factors which might have an impact on the candidate's demonstration of competency.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a variety of assignments and activities reflecting the scope and practical requirements of research and practical assignments
- assessment can be through assignments, projects, excursions and simulated project-based activity and must include evidence relating to each of the elements in this

## **EVIDENCE GUIDE**

unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess underpinning knowledge.

## Range Statement

### 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. Add any 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.

***Range of water and waste systems*** include:

- water catchment systems
- water storage systems
- water treatment systems
- water distribution systems
- stormwater drainage systems
- sewerage systems and sewerage treatment systems
- trade waste treatment systems.

***Appropriate water industry terms*** include:

- sewage versus sewerage
- rising main or pressure main
- reservoirs and tanks
- standpipes
- pumping stations
- water and wastewater
- stormwater
- infiltration and inflow
- pressure and head
- flow
- concentration.
- installation of water saving fittings
- behavioural change
- roof water re-use
- grey water recycling.

***Ways for households*** to minimise water usage and increase available supply include:

- use of tiered water access or rationing systems
- promotion and use of incentives to drive behavioural change in consumers
- planning changes to allow water recycling and re-use
- introduction of third pipe systems in new housing estates.
- introduction of desalination plants
- introduction of new treatment plants and re-use strategies
- development of new catchment infrastructure.

***Ways to increase sources*** include:

- impact of mismanagement of potential pollutants
- impact of mismanagement of biological agents and contaminants

***Environmental risks and impacts*** may include:



## **RANGE STATEMENT**

- impact of variable and changing water resources
- community waste disposal
- impact on urban and non-urban water catchment areas
- impact on rivers, waterways and channels
- water and wastewater treatment processes
- trade waste treatment and disposal processes
- construction and infrastructure
- risk factors for catchment water quality
- backflow and cross-connections
- stormwater
- function of wastewater and stormwater systems.

## **Unit Sector(s)**

Not applicable.

## NWP102B Design a basic water system model

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to explore and apply the characteristics of basic water and wastewater systems to a system model. This includes understanding the characteristics of simple water and wastewater systems, together with the application of scientific principles to the development of a working water system model.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for those who are preparing to enter or considering entry to the water industry workforce or further training. When delivered and assessed as part of a qualification, the unit will be customised to ensure its relevance to work-like activities and assignment and field work related water research. The candidate will benefit from partnership with a water industry organisation. There are opportunities to integrate delivery and assessment of this unit with mainstream educational programs (mathematics, science, geography, physics, engineering and English).

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Investigate local water and wastewater systems.</b>	1.1 Find out about and explain <i>source</i> of local water supply system and explore its characteristics. 1.2 Identify local water distribution system and explain its characteristics. 1.3 Find out about and explain water metering and allocation system and related water pricing system. 1.4 Find out about local wastewater collection and treatment systems and explain their characteristics.
<b>2 Apply basic scientific principles to the operation of a water system.</b>	2.1 Explore and explain <i>basic principles governing the natural flow of water</i> . 2.2 Find out about <i>basic principles governing the distribution of water</i> through pipe networks and explain them. 2.3 Use scientific principles in the design, construction and operation of a working model of a water system. 2.4 Use scientific principles to measure the flow of water.
<b>3 Investigate safe and effective operations of water and wastewater systems.</b>	3.1 Find out about potential risks to health of inappropriately installed, managed or used water systems and explain the risks. 3.2 Find out about potential risks to health of inappropriately installed, managed or used wastewater systems and explain the risks. 3.3 Find out about and explain <i>ways</i> to use water wisely and dispose of wastewater safely. 3.4 Find out about and explain ways that communities can improve the efficiency and environmental impact of wastewater management.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- use research and investigation to gather information and test models and hypotheses
- use literacy skills for verbal and written communication
- use interpersonal and communication skills, including listening, questioning and receiving feedback
- work cooperatively and collaboratively with others to complete project tasks
- adapt and modify activities depending on differing project contexts and environments
- use appropriate techniques to solve or report problems identified when completing project tasks
- carry out calculations that may be required when completing tasks, particularly those including the four basic mathematical operations
- apply basic principles of science, including hydraulics, to develop an understanding of the flow of water
- take appropriate initiative to deal with problems and complete tasks
- identify and use equipment, tools and other technology required to complete project tasks
- recognise limitations, ask for help and seek clarification or information about requirements and procedures.

#### **Required knowledge:**

- mathematical calculations and techniques
- relevant scientific knowledge, including basic principles of hydraulics, valve operation and pipe layout
- procedures for identifying and using relevant technology when carrying out calculations
- typical problems in the design of simple water systems and appropriate actions and solutions.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to explore and apply the characteristics of basic water and wastewater systems to a system model including:

- investigating, interpreting and communicating the essential characteristics of local water and wastewater systems
- selecting and applying basic scientific principles associated with the design and construction of a water system model
- problem solving sound practices that can be adopted by householders and communities for the safe and effective management of a water and wastewater system.

#### **Context of and specific resources for assessment**

Access to resources including:

- library, water enterprise information, information sources for research and investigation
- mentors, advisors and teachers able to guide and support research and investigation of water resource management
- guided visits to key locations associated with water resource management.

Access must be provided to appropriate learning and assessment support.

Assessment processes and techniques must take into account language, literacy and cultural factors which might have an impact on the candidate's demonstration of competency.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a variety of assignments and activities reflecting the scope and practical requirements of research and practical assignments
- assessment can be through assignments, projects, excursions and simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess underpinning knowledge.

## Range Statement

### 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. Add any 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.

***Source*** of local water supply system may be:

- groundwater systems
- river systems
- lakes
- dams.

***Basic principles governing the natural flow of water*** may include:

- introduction to basic fluid mechanics
- introduction to basic hydraulics
- principles governing:
  - hydraulics
  - gradient
  - pressure
  - current and flow
  - depth
  - dam design
  - river channel behaviour.

***Basic principles governing the distribution of water*** may include:

- introduction to basic engineering principles governing the operation of valves and pumps
- introduction to basic hydraulic principles governing pipe network design and layout
- flow measurement.

***Ways to use water wisely and dispose of wastewater safely*** may include:

- participation in, or reference to, government programs and initiatives, such as:
  - water recycling
  - storm water catchment and reuse
  - on site treatment
  - Waterwatch program
  - Waterwise program
  - Greening Australia program
  - Landcare program.

### Unit Sector(s)

Not applicable.





## NWP103B Demonstrate care and safe practices

### Modification History

Not applicable.

### Unit Descriptor

#### Unit descriptor

This unit of competency describes the outcomes required to understand, apply and satisfy safe practices in a work-like context. It includes identifying and following procedures for hazards and risks, monitoring and maintaining cleanliness and tidiness in work activities, and reporting hazards and risks in appropriate ways. It may apply to general OHS requirements and specific workplace policies and procedures.

Training and assessment against this unit of competency must incorporate relevant OHS and related legislative requirements.

### Application of the Unit

#### Application of the unit

This unit supports the attainment of skills and knowledge required for those who are preparing to enter the water industry workforce or undertaking assignment and field work related to water research. The candidate will be assisted by partnership with a water industry organisation to achieve the outcomes of this unit in a workplace setting. The work environment for this unit may be a work-like or educational environment.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

### Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Follow safe work procedures.</b>	<p>1.1 Find out about and describe typical <i>hazards</i> associated with working with water.</p> <p>1.2 Check relevant OHS, <i>hazard control procedures</i> and <i>strategies</i> to ensure <i>safe work practices</i> and use them to assess ways to overcome identified hazards.</p> <p>1.3 Check and apply safety procedures for reporting hazards in the work environment.</p> <p>1.4 Use <i>personal protective clothing and equipment</i> specified in safety and workplace procedures.</p>
<b>2 Maintain personal wellbeing in a work environment.</b>	<p>2.1 Assess <i>risks to personal wellbeing</i> which may affect safe performance and follow procedures to address them.</p> <p>2.2 Follow procedures for maintaining a tidy and clean personal work area.</p>
<b>3 Be aware of and report on safety of self and others.</b>	<p>3.1 Identify situations that may endanger own safety and that of other workers and report them.</p> <p>3.2 Deal with incidents and injuries promptly and report them to <i>appropriate people</i> to contact when a problem arises.</p> <p>3.3 Take part in <i>activities</i> to foster safe working.</p>
<b>4 Follow emergency procedures.</b>	<p>4.1 Respond to a range of <i>emergencies</i>.</p> <p>4.3 Follow emergency procedures.</p> <p>4.3 Get help from team members and supervisors when needed.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- use literacy skills for interpreting safety information
- use interpersonal and communication skills, including listening, questioning and receiving feedback
- report activity and location hazards, OHS incidents and related action
- solve or report problems identified when dealing with safety hazards and applying appropriate hazard control procedures
- use personal protective clothing and equipment appropriate for safety risks
- follow instructions.

#### **Required knowledge:**

- procedures related to safe work practices to be followed in specific locations
- location hazards and ways to minimise or remove them
- equipment, materials and activities and the processes and precautions for their use
- personal protective clothing and equipment relevant to location and activity
- relevant hygiene and safety standards.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to understand, apply and satisfy safe practices in a work-like water operations context:

- identifying potential water assignment hazards
- understanding and applying appropriate safety requirements and safe work practices
- using appropriate personal protective clothing and equipment
- understanding factors that contribute to personal wellbeing and explore their effect on safety and performance
- understanding and applying procedures for proactively identifying and reporting potential and actual threats to safety
- understanding and applying procedures for dealing with emergency situations.

#### ***Context of and specific resources for assessment***

Access to resources including:

- library, water enterprise information, information sources for research and investigation
- mentors, advisors and teachers able to guide and support research and investigation of water resource management
- guided visits to key locations associated with water resource management.

Access must be provided to appropriate learning and assessment support.

Assessment processes and techniques must take into account language, literacy and cultural factors which might have an impact on the candidate's demonstration of competency.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a variety of assignments and activities reflecting the scope and practical requirements of research and practical assignments
- assessment can be through assignments, projects, excursions and simulated project-based activity and must include evidence relating to each of the elements in this unit.

## **EVIDENCE GUIDE**

In all cases where practical assessment is used it will be combined with targeted questioning to assess underpinning knowledge.

## Range Statement

### 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. Add any 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.

***Hazards*** may include:

- untidy work conditions, including poor hygiene practices and unnecessary obstacles and equipment in work areas
- moving machinery
- materials handling
- working at heights
- lifting objects
- dangerous surfaces
- movement of equipment, goods and vehicles
- oxygen deficiency, toxic gases and confined spaces
- volatile and toxic substances
- live electrical conductors
- sharps in water, including needles, glass and metal fragments
- macerators and sharp mechanical devices
- earth subsidence
- failure of support systems
- high pressure water jets
- drowning
- traffic
- bush navigation and survival.

***Hazard control procedures*** may include:

- emergency, fire and accident procedures
- hazard identification and removal and hazard control
- use of personal protective clothing and equipment
- relevant manufacturer guidelines relating to the operation and use of equipment
- safety regulations
- safe use of chemicals and toxic substances.

Strategies to ensure ***safe work practices*** may include:

- manual handling procedures
- correct posture
- safe lifting and bending
- using appropriate personal protective clothing and equipment
- good hygiene and health maintenance.

***Personal protective clothing***

- gloves

## **RANGE STATEMENT**

*and equipment* may include:

- masks
- aprons
- hair covering
- uniform
- safety headwear and footwear
- safety glasses
- two-way radios
- high visibility clothing.

*Risks to personal wellbeing*

are actions by an individual that may affect their ability to work safely and may include:

- smoking, alcohol and drug use
- lack of sleep
- poor diet
- lack of exercise
- stress
- not using appropriate methods when lifting or moving heavy objects
- not wearing proper personal protective clothing
- not using appropriate personal protective equipment.

*Appropriate people* may include:

- supervisors
- team leaders
- other persons authorised or nominated by the organisation.

*Activities* may include:

- problem solving meetings
- suggestion schemes
- regular communication with team leaders
- training
- information sessions.

*Emergencies* may include:

- accidents, including those that do not result in injury
- injuries such as cuts, scalds and burns
- health conditions such as fainting, asthma attacks and allergic reactions
- spills and leakages of harmful gas and liquids
- structural failures and breakages
- fire
- flooding
- getting lost
- power failures or shorts.

## **Unit Sector(s)**

Not applicable.



## NWP104B Sample and test water sources and quality

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to collect and prepare water samples and perform water flow and quality tests according to specified standards and parameters relevant to water quality standards.

Training and assessment against this unit of competency must incorporate relevant OHS and related legislative requirements.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for those who are preparing to enter or considering entry to the water industry workforce or undertaking assignment and field work related to water research. The candidate will be assisted by partnership with a water industry organisation. There are opportunities to integrate delivery and assessment of this unit with mainstream high school programs (mathematics, science, geography, physics, engineering and English). The unit may be applied in a work-like or educational environment.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for and conduct water quality sampling.	1.1 Develop sampling plan documenting required <i>samples, sampling locations</i> and sampling schedules to meet <i>assignment requirements</i> . 1.2 Select and check appropriate <i>sampling equipment</i> for the task prior to use. 1.3 Collect samples according to sampling plan and ensure safety procedures are followed to limit hazards and contamination to self, work area and environment. 1.4 Maintain <i>integrity of samples</i> during sampling and label sample containers according to organisational requirements. 1.5 Check and record sample information. 1.6 Record results of repeat sampling to identify trends.
2 Prepare for and conduct water quality tests.	2.1 Confirm instructions for conducting and recording basic water quality tests and <i>plan testing work</i> according to <i>standard practice</i> . 2.2 Select, check and use required testing and personal protective clothing and equipment. 2.3 Identify and record correct samples for testing. 2.4 Conduct <i>basic water quality tests</i> according to standard procedures, ensuring that sample integrity is maintained during the testing process.
3 Finalise work.	3.1 Make <i>records</i> according to assignment requirements. 3.2 Report observations or measurements that are outside established organisational guidelines for further action. 3.3 Dispose of samples and clean and store test equipment according to organisational procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- prepare, collect, label and preserve water samples
- dispose of waste and spent samples correctly
- produce reports and logs
- plan work activities
- conduct basic water quality tests
- use and calibrate testing equipment
- work effectively as part of a team
- perform task-related calculations
- follow plans and instructions
- apply procedures and standards
- use literacy skills for verbal and written communication in the assignment
- use personal protective clothing and equipment.

#### **Required knowledge:**

- types and purposes of water samples
- procedures and techniques for water sampling
- range and purpose of basic water quality testing
- test procedures
- procedures for disposal of waste and excess water samples
- task-related calculations
- relevant policies, procedures and standards
- assignment planning processes.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to collect and prepare water samples and perform water flow and quality tests according to specified standards and parameters relevant to water quality standards including:

- identifying potential hazards in water sampling.
- planning and organising sampling and testing assignment.
- using appropriate sampling and testing equipment and personal protective clothing and equipment.
- understanding and applying procedures for water sampling and testing.
- determining and reporting accurate and relevant results from testing.

#### **Context of and specific resources for assessment**

Access to resources including:

- library, water enterprise information, information sources for research and investigation
- mentors, advisors and teachers able to guide and support research and investigation of water resource management
- guided visits to key locations associated with water resource management.

Access must be provided to appropriate learning and assessment support.

Assessment processes and techniques must take into account language, literacy and cultural factors which might have an impact on the candidate's demonstration of competency.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a variety of assignments and activities reflecting the scope and practical requirements of research and practical assignments
- assessment can be through assignments, projects, excursions and simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess underpinning

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knowledge.

## Range Statement

### 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. Add any 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.

***Samples*** may include:

- grab, composite or flow-weighted composite samples for:
- microbiological testing
- testing for chemical and physical characteristics.

***Sampling locations*** may include:

- raw water supply, including:
- surface water
- groundwater
- water distribution and treatment systems.

***Assignment requirements*** for sampling procedures that may be established in a real or simulated environment may include:

- standard procedures
- Australian Standards, such as AS/NZS 5667 Water quality - sampling
- state Environment Protection Authority sampling guidelines
- legislative requirements
- safety procedures.

***Sampling equipment*** may include:

- buckets or wide-mouthed containers
- depth samplers
- sample dippers
- sterile sample containers:
- plastic
- glass
- test-specific (such as acid washed)
- weighted sample bottles
- dip tubes
- composite and discrete automatic samplers
- equipment for preservation of samples, including:
- refrigeration
- cool storage devices
- screw top containers
- containers for storing and carrying samples safely.

***Integrity of samples*** is maintained by ensuring:

- application of correct:
- holding time
  - storage procedures
  - sub-sampling procedures.

## RANGE STATEMENT

**Plan testing work** to address a range of requirements, including:

- timelines
- communication with other team members and individuals
- interpretation of organisational and statutory requirements
- locations, such as:
  - on-site testing
  - field-based testing
  - laboratory
- range of testing procedures and techniques that applies to organisational, plant or field sites
- variety of samples to be tested
- testing equipment to be used
- test reporting systems.

**Standard practice** for testing procedures that may be established in a real or simulated environment, may include:

- standard procedures for testing
- equipment manufacturers' operations manuals
- methods recommended by Australian Public Health Association (APHA) reference document: 'Standard methods for the examination of water and wastewater'
- methods recommended by American Society for Testing Materials (ASTM) International
- safety procedures, including:
  - risk and hazard assessment
  - safe handling of samples and chemicals
  - use of personal protective clothing and equipment
  - relevant organisational policies
  - local authority regulations and federal, state or territory legislative requirements.

**Basic water quality tests** include the range of tests required for competent performance of work tasks in an organisational context, and should comprise at least three of the following types of test:

- pH
- temperature
- electrical conductivity
- microscopy
- turbidity
- colour
- chlorine residue
- jar testing
- alkalinity
- hardness
- dissolved oxygen.

**Records** may include:

- sample records, field detail sheets or chain of custody forms, including information such as:
  - time sample was taken
  - details of person collecting sample



## **RANGE STATEMENT**

- sample point
- volume of sample
- data gathered at time of collection
- pre-treatment
- preservation
- instructions to transporters
- time and logging of sample receipt and testing
- visual observations
- equipment identification
- atypical results
- test results.

## **Unit Sector(s)**

Not applicable.

## **NWP105B Draw and use simple maps, plans and drawings**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to read and interpret maps, plans and drawings and prepare a simple map or plan.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for those who are preparing to enter or considering entry to occupations in water resource management or undertaking assignment and field work related to water research. The candidate will be assisted by partnership with a water industry organisation. There are opportunities to integrate delivery and assessment of this unit with mainstream high school programs (mathematics, science, geography, physics, engineering and English). The unit may be applied in a work-like or educational environment.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Interpret maps, plans and drawings.</b>	<p>1.1 Find out what <b><i>types of maps, plans and drawings</i></b> are used to support work tasks.</p> <p>1.2 Check and interpret <b><i>key features of maps and site plans</i></b> and commonly used symbols and abbreviations.</p> <p>1.3 Explain function of the legend.</p> <p>1.4 Check and explain natural and man-made features on maps, plans and drawings.</p>
<b>2 Use maps and plans.</b>	<p>2.1 Explain the <b><i>orientation of sites</i></b>.</p> <p>2.2 Follow a map or plan to find identified features in the real world.</p> <p>2.3 Calculate real world distances using maps and plans with a range of scales.</p>
<b>3 Draw a map or plan.</b>	<p>3.1 Prepare a simple map or plan, including selecting tools and equipment and a workable scale, key and abbreviations.</p> <p>3.2 Take real world measurements and record features on a drawing.</p> <p>3.3 Use field notes and measures to draw a local area map.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- read and interpret plans, drawings and specifications
- measure accurately
- communicate effectively
- work effectively as part of a team
- use literacy skills for verbal and written communication in the workplace
- use information provided in maps, plans and drawings to complete a job.

#### **Required knowledge:**

- the range of maps, plans and drawings to different assignment situations
- measurements and calculations
- features of maps, plans and drawings such as:
  - contours
  - datum points
  - planes
  - gradients
  - sections
  - orthographic projections
  - symbols
  - dimensions
  - terminology.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to read and interpret maps, plans and drawings and prepare a simple map or plan including:

- interpreting all relevant information on maps, plans and drawings to facilitate assignment or project.
- preparing a simple map or plan that represents a real world local environment.

#### **Context of and specific resources for assessment**

Access to resources including:

- library, water enterprise information, information sources for research and investigation
- mentors, advisors and teachers able to guide and support research and investigation of water resource management
- guided visits to key locations associated with water resource management.

Access must be provided to appropriate learning and assessment support.

Assessment processes and techniques must take into account language, literacy and cultural factors which might have an impact on the candidate's demonstration of competency.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a variety of assignments and activities reflecting the scope and practical requirements of research and practical assignments
- assessment can be through assignments, projects, excursions and simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess underpinning knowledge.

## Range Statement

### 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. Add any 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.

***Types of maps, plans and drawings*** may include:

- urban and rural topographical maps
- site plans and elevations
- process flow sheets
- survey plans
- sectional plans and elevations
- channel drainage plans
- pipe system plans
- location of assets plans.

***Key features of maps and site plans*** will include combinations of:

- shape and orientation of site
- roads
- railways
- easements
- existing buildings and structures
- services, including:
  - drainage
  - sewerage
  - gas
  - water
  - electricity
  - telecommunications
- dimensions
- grades of pipelines and channels
- tree preservation orders
- geographical features
- power and transmission lines
- heritage and cultural features
- types of structures, including:
  - buildings
  - bridges
  - fabricated towers
  - fences
  - pipelines
  - regulators
  - poles

## **RANGE STATEMENT**

- environmental barriers
- environmental features, including:
- fauna and flora habitats
- cultural features
- heritage features
- water catchments
- shape of structure and building
- service requirements
- location of plant and equipment
- vertical and horizontal measurements
- clearance distance
- geological features
- service layouts
- bore and casing details.
- relationship to north
- currency of plan
- relationship between plan and site.

*Orientation of sites* may include:

## **Unit Sector(s)**

Not applicable.

## **NWP201B Follow defined OHS procedures and regulatory requirements**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to follow defined OHS procedures and regulatory requirements related to the work being undertaken in order to ensure one's own safety and that of others in the workplace.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for all operators within the water industry to be able to understand and apply OHS policies and processes within the workplace.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Apply workplace OHS procedures.</b>	<p>1.1 Recognise and understand <b><i>workplace OHS policies and procedures.</i></b></p> <p>1.2 Apply OHS policies and procedures in designated workplaces.</p> <p>1.3 Identify <b><i>personnel with OHS responsibilities</i></b> and apply workplace procedures for managing OHS.</p>
<b>2 Follow workplace procedures for hazard identification and risk control.</b>	<p>2.1 Identify <b><i>potential hazards relating to specific jobs</i></b> and roles within the workplace and consider and assess control measures.</p> <p>2.2 Recognise hazards in relation to specific work or work areas and report them to designated personnel according to workplace procedures.</p> <p>2.3 Follow <b><i>workplace procedures</i></b> and work instructions for controlling risks.</p> <p>2.4 Follow workplace procedures for dealing with incidents, accidents and emergencies and complete appropriate reporting.</p>
<b>3 Contribute to participative arrangements for the management of OHS.</b>	<p>3.1 Raise OHS issues with designated personnel according to workplace procedures and relevant OHS legislation.</p> <p>3.2 Make contributions to participative arrangements for OHS management in the workplace within organisational procedures and scope of work responsibilities.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply relevant legislative responsibilities
- interpret and apply safety systems
- identify and report hazards
- work effectively as part of a team
- apply personal risk control strategies
- communicate effectively in the workplace
- use literacy skills in regard to verbal and written communication in the workplace
- complete basic workplace records and reports.

#### **Required knowledge:**

- relevant legislative and statutory requirements and responsibilities
- site and equipment safety systems
- reporting procedures
- manual handling procedures
- personal safety measures
- workplace hazards
- risk control procedures
- signs and symbols in the workplace
- water hazardous agents and preventative strategies.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to follow defined OHS procedures and regulatory requirements related to the work being undertaken in order to ensure one's own safety and that of others in the workplace including:

- following procedures for health and safety, risk control and hazard management for a range of tasks falling within the job role
- recording and reporting a hypothetical workplace accident according to enterprise and workplace procedures
- selecting, checking, using and maintaining personal protective equipment, for example that required to enter a confined space.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations
- access to a range of work locations, activities and equipment which require demonstration of OHS procedures compliance.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's

## EVIDENCE GUIDE

- competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
  - where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
  - assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Workplace OHS policies and procedures*** may be informed by and address:

- relevant federal and state or territory OHS legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs

***Personnel with OHS responsibilities*** may include:

- team leaders and workplace supervisors
- nominated OHS representatives
- members of OHS workplace committees.

***Potential hazards relating to specific jobs*** will vary according to the operations of the workplace and nature of work being undertaken. It is important that the scope of work and risks are canvassed. Potential risks may include:

- those associated with working:
  - in confined spaces
  - at height
  - with hazardous substances
  - with electricity
  - with plant and equipment
- specific hazards relating to the water industry, including:
  - engulfment hazards
  - hygiene (wastewater treatment)
  - needles in public recreation areas (dams).

***Workplace procedures*** may include:

- hazard policies and procedures
- emergency, fire and accident procedures
- senior first aid
- practical emergency response techniques
- basic incident management
- procedures for the use of personal protective clothing and equipment
- hazard identification and issue resolution procedures
- tag-out
- lock-out
- confined space entry permits
- job procedures and work instructions
- job evaluation safety analysis (JESA)
- job safety analysis (JSA).

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Common

# NWP202B Apply environmental and licensing procedures

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to implement established environmental and licensing procedures, contribute to improved environmental practices, and identify and minimise environmental risks and the impact of work-related activities on the local environment.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff, construction workers and other operators within the water industry.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<p><b>1 Relate environmental procedures to specific project or site.</b></p>	<p>1.1 Identify and apply organisation's environmental procedures.</p> <p>1.2 Identify and apply relevant <b><i>legislative, regulatory and licensing requirements</i></b>.</p> <p>1.3 Identify and record <b><i>environmental risks and impacts</i></b> at particular job sites according to organisational requirements.</p> <p>1.4 Plan work, incorporating appropriate control measures to overcome identified risks, and meet required environmental outcomes on <b><i>specific project or site</i></b>.</p>
<p><b>2 Apply established environmental procedures.</b></p>	<p>2.1 Undertake work on project or site according to organisation's established environmental procedures.</p> <p>2.2 Apply organisational procedures for dealing with environmental incidents.</p>
<p><b>3 Report on environmental processes and incidents.</b></p>	<p>3.1 Access and maintain <b><i>documentation</i></b> relating to environmental management.</p> <p>3.2 Identify environmental risks and <b><i>record and report incidents</i></b> according to organisational procedures and practices.</p> <p>3.3 Follow reporting procedures for monitoring conformity according to organisational requirements.</p>



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply relevant legislative responsibilities
- identify and respond to operational problems
- access, interpret and apply standard operating procedures
- communicate effectively with internal and external customers
- use literacy skills in regard to verbal and written communication in the workplace
- apply environmental policies, plans and procedures
- work effectively as part of a team
- apply control procedures to environmental risks and incidents
- perform work-related calculations
- assess environmental risks at local work site
- complete basic workplace records and reports.

#### **Required knowledge:**

- relevant legislative requirements and responsibilities
- standard operating procedures
- established environmental management procedures
- control procedures for environmental risks and incidents
- risk assessment procedures
- environmental impact assessment
- water cycle
- ecologically sustainable development
- heritage conservation
- primary agencies involved in drinking water quality management
- water quality performance indicators
- overview of water supply system
- water hazardous agents and preventative strategies
- community and agency roles and responsibilities in monitoring water quality
- recording procedures
- basic workplace reporting 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement established environmental and licensing procedures including:

- contributing to improved environmental practices
- identifying and minimising environmental risks and the impact of work-related activities on the local environment
- assessing environmental protection requirements of a work site
- implementing appropriate environmental protection procedures
- assessing and reporting environmental risks and incidents.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative, regulatory and licensing requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Environmental risks and impacts*** may include:

- management of chemicals
- management of biological agents
- impact on limited water resources
- spillage
- waste disposal
- impact on urban and non-urban water catchment areas
- impact on rivers, waterways and channels
- water and wastewater treatment processes
- trade waste treatment and disposal processes
- construction conditions and processes.

***Specific project or site*** may include:

- buildings
- plants
- construction and maintenance sites
- workshops
- laboratories
- bulkwater storage sites
- surface or groundwater sites
- catchments
- flood plains
- irrigation sites
- wetlands
- drainage sites
- waste disposal sites.

Environmental management ***documentation*** may include:

- information on applicable environmental laws or regulatory conditions
- complaint records

## **RANGE STATEMENT**

- training records
- process information
- process operational logbooks
- inspection, maintenance and calibration records
- relevant contractor and supplier information
- incident reports
- information on emergency preparedness and response
- records of significant environmental impacts
- compliance records
- audit reports
- incident management policy, guidelines, plans and procedures
- incident management standards
- site operating licences
- environmental impact plans
- statement of environmental effects
- management reviews.

***Recording and reporting***  
may include:

- following procedures relevant to the role and organisation, which may require:
- written reports
- proforma reports
- verbal reports.

***Incidents*** may include:

- emissions to air
- releases to/of water
- releases to land
- vibration and noise
- disposal of waste
- contamination of land
- impact on communities
- destruction of habitat
- use of energy sources
- waste generation processes and technologies
- impact on culturally significant sites
- and may involve the implementation of emergency responses.

## **Unit Sector(s)**

Not applicable.

## Competency field

Competency field    Common

## NWP203B Plan and organise personal work activities

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to plan and organise personal work activities to meet specified outcomes, including identifying and using resources and equipment and applying customer service policies.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff who work under supervision but who are required to exercise responsibility for their own effective work performance.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and conduct assigned work activities.</b>	1.1 Identify work activities and relevant <i>legislation and organisational procedures</i> . 1.2 Organise and <i>plan work activities</i> to achieve agreed outcomes. 1.3 Identify and obtain resources to complete planned work activities.
<b>2 Monitor quality of work.</b>	2.1 Interpret and check instructions against relevant organisational standards of work. 2.2 Seek clarification of work instructions as required. 2.3 Monitor and adjust work according to requirements for job quality, customer service, public responsibility and resource use.
<b>3 Provide and obtain feedback and information on work activities.</b>	3.1 <i>Record and report</i> work activities according to organisational requirements. 3.2 Access appropriate avenues to provide suggestions for improvement to personal work performance.



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- prepare, identify and respond to operational problems
- complete basic reports, records and logs
- follow work instructions
- follow policies, procedures and standards
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- communicate such things as work requirements effectively
- assertiveness
- time management.

#### **Required knowledge:**

- organisational reporting and communication systems
- work planning processes
- legislative and organisational policies, procedures and standards
- administrative procedures
- quality systems
- organisational procedures for contractors
- reporting 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to plan and organise personal work activities to meet specified outcomes, including:

- identifying and using resources and equipment
- applying customer service policies
- identifying, prioritising and planning work tasks
- identifying and applying appropriate quality standards
- monitoring work performance and seeking feedback.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

## EVIDENCE GUIDE

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislation and organisational procedures*** include:

- by-laws and organisational policies
- standard operating procedures
- equal employment opportunity
- OHS.

***Plan work activities*** will require:

- interpretation of instructions and directions
- assessment and prioritisation of workload
- adherence to timelines
- interaction and communication with team members and individuals
- interpretation of legislation and organisational procedures
- reference to:
  - productivity requirements
  - total quality management principles
  - customer service requirements.

***Record and report*** information relating to work activities, including:

- completion of time sheets
- requisitions
- work sheets and job cards
- basic workplace records and verbal or written reports.

### Unit Sector(s)

Not applicable.

### Competency field

Competency field      Common

## **NWP207A Work effectively in the water industry**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to work effectively in the water industry. It requires an understanding of the role of water organisations in the community, services they provide, water systems used, the importance of maintaining water quality, and structure of the organisation.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for new entrants to the industry or those who are preparing to enter the water industry workforce.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Assess the importance of water services to the community.	<p>1.1 Explore and explain structure of the water industry nationally, at a state and territory level, and locally.</p> <p>1.2 Explore and explain <b><i>range of water and waste systems</i></b> used to deliver services.</p> <p>1.3 Explore and explain community's use of water services.</p> <p>1.4 Review and assess <b><i>strategies</i></b> to ensure long-term water sustainability.</p>
2 Assess the factors affecting water quality.	<p>2.1 Review <b><i>legislative, regulatory and licensing requirements</i></b> governing the organisation and understand their impact.</p> <p>2.2 Identify characteristics, requirements and standards for drinking water.</p> <p>2.3 Conduct simple tests for assessing water quality.</p> <p>2.4 Identify and assess <b><i>environmental risks and impacts</i></b> to water services.</p> <p>2.5 Identify organisational procedures for maintaining water quality.</p>
3 Apply knowledge and understanding of the organisation's systems and structure to work.	<p>3.1 Identify and describe water and waste systems and infrastructure used by the organisation in delivery of its services.</p> <p>3.2 Review and describe organisation's management structure and role relationships.</p> <p>3.3 Review and apply organisation's key policies and procedures.</p> <p>3.4 Review and apply standard reporting procedures and identify impact on own work.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- access, interpret and apply relevant organisational and legislative requirements
- identify system and infrastructure components
- identify organisational structure and its components
- identify environmental policies, plans and procedures
- perform work-related calculations
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- complete basic workplace records and reports.

#### **Required knowledge:**

- relevant legislative requirements and responsibilities
- standard operating procedures
- established environmental management procedures
- risk management principles
- control procedures for environmental risks and incidents
- environmental impact assessment
- primary agencies involved in drinking water quality management
- water quality performance indicators
- overview of the water supply system
- water hazardous agents and preventative strategies
- community and agency roles and responsibilities in monitoring water quality
- recording procedures
- basic workplace reporting 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to work effectively in the water industry including:

- assessing water sustainability strategies, with reference to the structure of the water industry and water industry services
- identifying characteristics of water quality and applying procedures for maintaining water quality to legislation and organisational requirements
- applying key organisational policies and procedures to a specific job role.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition



## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Range of water and waste systems*** may include:

- water catchment systems
- water storage systems
- water treatment systems
- water distribution systems
- stormwater drainage systems
- sewerage systems and sewerage treatment systems
- trade waste treatment systems.

***Strategies*** to ensure long-term water sustainability may include:

- water conservation, including:
- water saver fittings and fixtures
- behavioural change
- water rationing strategies
- water recycling and re-use
- water treatment and re-use
- third pipe systems
- improved catchment and storage.

***Legislative, regulatory and licensing requirements*** will include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Environmental risks and impacts*** may include:

- impact of mismanagement of chemicals
- impact of mismanagement of biological agents
- detrimental impact on limited water resource
- spillage
- waste disposal
- detrimental impact on urban and non-urban water catchment areas
- detrimental impact on rivers, waterways and channels
- unsatisfactory water and wastewater treatment processes
- unsatisfactory trade waste treatment and disposal processes

## **RANGE STATEMENT**

- poor construction processes.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Common

## NWP208A Perform basic wastewater tests

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to perform basic wastewater tests.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with responsibility for preparing for, conducting and reporting on basic wastewater tests in wastewater treatment and system operations.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for basic wastewater tests.</b>	<p>1.1 Receive instructions for conducting and recording <b><i>basic wastewater tests</i></b> and confirm with appropriate personnel.</p> <p>1.2 Confirm <b><i>testing details</i></b> and <b><i>plan testing work</i></b> according to <b><i>legislative and organisational requirements</i></b>.</p> <p>1.3 Select, fit and use personal protective equipment specified for routine wastewater tests.</p> <p>1.4 Prepare and check <b><i>testing equipment</i></b> according to organisational requirements.</p>
<b>2 Conduct basic wastewater tests.</b>	<p>2.1 Locate and identify correct samples for testing and report <b><i>abnormal sample characteristics</i></b>.</p> <p>2.2 Conduct basic wastewater tests according to organisational requirements.</p> <p>2.3 <b><i>Maintain integrity of samples</i></b> during testing.</p> <p>2.4 Identify <b><i>atypical data</i></b> and take appropriate action.</p>
<b>3 Finalise work.</b>	<p>3.1 Record relevant <b><i>information</i></b> according to organisational requirements.</p> <p>3.2 Dispose of samples and clean and store test equipment according to organisational procedures.</p> <p>3.3 Clear and restore work area according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- conduct basic wastewater tests
- calibrate testing equipment
- operate testing equipment
- conduct sub-sampling
- dispose of samples and waste
- communicate effectively
- produce reports and logs
- perform relevant work-related calculations
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- interpret work requirements.

#### **Required knowledge:**

- range and purpose of basic wastewater testing
- procedures for the use of instruments and other field-testing equipment
- test procedures
- relevant work-related calculations
- maintenance and storage of reagents
- sub-sampling and basic wastewater test methods
- documentation procedures for test results
- sample and waste disposal procedures
- relevant legislative and organisational requirements.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to perform basic wastewater tests by:

- interpreting testing requirements and procedures
- preparing, checking and using equipment correctly
- conducting at least three different tests safely while maintaining the integrity of samples
- recording all relevant information.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

## **EVIDENCE GUIDE**

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Basic wastewater tests*** include:

- range of tests required for competent performance of work tasks in the organisational context, which should comprise at least three of the following types of test:
  - pH
  - temperature
  - electrical conductivity
  - dissolved oxygen
  - microscopy
  - thirty minute settleability
  - settleable solids concentration (cone test)
  - turbidity.

***Testing details*** may include:

- locations, including:
  - on-site testing
  - field-based testing
  - laboratory
- range of testing procedures and techniques that apply to organisational, plant or field sites
- variety of samples to be tested
- testing equipment
- test reporting systems.

***Planning of testing work*** may include:

- interpretation of instructions and directions
- timelines
- interaction and communication with team members and individuals
- interpretation of legislative and organisational requirements.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

## RANGE STATEMENT

*Testing equipment* may include:

- portable meters, such as:
- pH meters
- electrical conductivity meters
- thermistors
- comparators
- pocket colorimeters
- dissolved oxygen meters
- test kits
- microscopes
- thermometers
- Imhoff cones
- graduated cylinders and settling apparatus.

*Abnormal sample characteristics* may include:

- insufficient sample volume
- odour
- visible contaminants, such as:
- scum
- debris
- discolouration.

*Maintaining integrity of samples* may include application of correct:

- holding time
- storage procedures
- sub-sampling procedures.

*Atypical data* may include:

- results that fall outside organisational range requirements
- results that fall outside legislated range requirements.

*Information* may include:

- time and logging of sample receipt and testing
- visual observations
- equipment identification
- atypical results
- test results.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field    Common

## **NWP209B Use maps, plans, drawings and specifications**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to read and interpret maps, plans, drawings and specifications.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff involved in the location, construction and maintenance or repair of assets, such as plants, pump stations and infrastructure.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Interpret maps, plans and drawings.</b>	1.1 Identify main <b><i>types of maps, plans, drawings and specifications</i></b> used to support work tasks. 1.2 Identify parts of water systems and their interrelationship on a range of drawing types. 1.3 Interpret commonly used symbols and abbreviations. 1.4 Interpret function of the legend. 1.5 Verify latest version of map, plan or drawing.
<b>2 Use maps and site plans to support work activities.</b>	2.1 Apply organisation's <b><i>system for managing maps and plans</i></b> . 2.2 Apply relevant <b><i>technologies</i></b> used to gather, record and monitor, map and plan data. 2.3 Identify function and <b><i>key features of maps and site plans</i></b> in the planning of work. 2.4 Identify <b><i>orientation of the site</i></b> . 2.5 Identify and isolate access from roadways to work site. 2.6 Determine materials and distances from plans and drawings.
<b>3 Read and interpret specifications.</b>	3.1 Relate specifications to particular maps and plans and identify quality standards. 3.2 Identify and determine types of details from works specifications.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- read and interpret maps, plans, drawings and specifications
- measure accurately
- communicate effectively
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- use information provided in maps, plans and drawings to complete a job and in different work situations.

#### **Required knowledge:**

- measurements and calculations
- contours
- datum points
- planes
- gradients
- sections
- orthographic projection
- symbols
- dimensions
- terminology.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to read and interpret maps, plans, drawings and specifications including:

- locating correct maps, plans, drawings and specifications for work tasks
- interpreting correctly all relevant information in maps, plans, drawings and specifications to enable the work to be performed correctly, effectively and according to organisational quality standards.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

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demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Types of maps, plans, drawings and specifications*** may include:

- urban and rural topographical maps
- site plans and elevations
- process flow sheets
- survey plans
- sectional plans and elevations
- channel drainage plans
- pipe system plans
- location of assets plans
- details and specifications providing illustrations and dimensions.

***System for managing maps and plans*** used within organisation may be:

- geographic information systems
- electronic plans management systems
- manual systems
- hard copy systems.

***Technologies*** used to gather, record and monitor map and plan data may:

- vary across organisations
- include use of global positioning system (GPS) technology and require the use of portable navigation devices by operators.

***Key features of maps and site plans*** will include combinations of:

- shape and orientation of site
- roads
- railways
- easements
- existing buildings and structures
- services, including:
  - drainage
  - sewerage
  - gas
  - water
  - electricity and telecommunications
- dimensions
- grades of pipelines and channels
- tree preservation orders
- geographical features
- power and transmission lines

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- heritage and cultural features
  - types of structure, including:
    - buildings
    - bridges
    - fabricated towers
    - fences
    - pipelines
    - regulators
    - poles
    - environmental barriers
  - environmental features, including:
    - fauna and flora habitats
    - cultural features
    - heritage features
    - water catchments
    - shape of structure and building
    - service requirements
    - location of plant and equipment
    - vertical and horizontal measurements
    - clearance distance
    - geological features
    - service layouts
    - bore and casing details.
- Orientation of the site* may include:
- relationship to north
  - currency of plan
  - relationship between plan and site.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Common

## NWP210B Perform basic water quality tests

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to perform basic water quality tests.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with responsibility for preparing for, conducting and reporting on basic water quality tests in general water industry and water treatment operations.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for basic water quality tests.</b>	<p>1.1 Receive instructions for conducting and recording <b><i>basic water quality tests</i></b> and confirm with appropriate personnel.</p> <p>1.2 Confirm <b><i>testing details</i></b> and <b><i>plan testing work</i></b> according to <b><i>legislative and organisational requirements</i></b>.</p> <p>1.3 Select, fit and use personal protective equipment specified for routine water tests.</p> <p>1.4 Prepare and check <b><i>testing equipment</i></b> according to organisational requirements.</p>
<b>2 Conduct basic water quality tests.</b>	<p>2.1 Identify and check correct samples for testing and report <b><i>abnormal sample characteristics</i></b>.</p> <p>2.2 Conduct basic water quality tests according to organisational requirements.</p> <p>2.3 <b><i>Maintain integrity of samples</i></b> during testing.</p> <p>2.4 Identify <b><i>atypical data</i></b> and take appropriate action.</p>
<b>3 Finalise work.</b>	<p>3.1 Record relevant <b><i>information</i></b> according to organisational requirements.</p> <p>3.2 Dispose of samples and clean and store test equipment according to organisational procedures.</p> <p>3.3 Clear and restore work area according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- conduct basic water quality tests
- calibrate testing equipment
- operate testing equipment
- conduct sub-sampling
- dispose of samples and waste
- communicate effectively
- produce reports and logs
- perform relevant work-related calculations
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- interpret work requirements.

#### **Required knowledge:**

- range and purpose of basic water quality testing
- test procedures
- abnormal characteristics of water samples
- atypical test result data
- relevant work-related calculations
- maintenance and storage of reagents
- requirements for maintaining sample integrity
- documentation procedures for test results
- sample and waste disposal procedures
- relevant legislative and organisational requirements.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to perform basic water quality tests by:

- interpreting testing requirements and procedures
- preparing, checking and using equipment correctly
- conducting at least three different types of test safely while maintaining the integrity of samples
- recording all relevant information.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

## **EVIDENCE GUIDE**

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Basic water quality tests*** include:

- range of tests required for competent performance of work tasks in the organisational context
- should comprise at least three of the following types of test:
  - pH
  - temperature
  - electrical conductivity
  - microscopy
  - turbidity
  - colour
  - chlorine residual
  - jar testing
  - hardness
  - dissolved oxygen.

***Testing details*** may include:

- locations, including:
  - on-site testing
  - field-based testing
  - laboratory
- range of testing procedures and techniques that apply to organisational, plant or field sites
- variety of samples to be tested
- testing equipment to be used
- test reporting systems.

***Plan testing work*** may include:

- interpretation of instructions and directions
- timelines
- interaction and communication with team members and individuals
- interpretation of legislative and organisational requirements.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and



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- Testing equipment* may include:
- induction programs
  - relevant community planning and development agreements, such as land care agreements.
  - portable meters, such as:
  - pH meters
  - electrical conductivity meter
  - thermistors
  - comparators
  - pocket colorimeters
  - dissolved oxygen meters
  - test kits
  - microscopes
  - thermometers.
- Abnormal sample characteristics* may include:
- insufficient sample volume
  - odour
  - visible contaminants, such as:
  - scum
  - debris
  - discolouration.
- Maintaining integrity of samples* may include:
- application of correct:
  - holding time
  - storage procedures
  - sub-sampling procedures.
- Atypical data* may include:
- results that fall outside organisational range requirements
  - results that fall outside legislated range requirements.
- Information* may include:
- time and logging of sample receipt and testing
  - visual observations
  - equipment identification
  - atypical results
  - test results.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field    Common

## NWP211B Use computerised systems

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to operate computer-based information systems to support the administration of the organisation's work.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for administration, field and operational staff involved in accessing, entering and retrieving information.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Operate the organisation's computer system.</b>	<p>1.1 <i>Operate software programs</i> relevant to role and maintain <i>integrity of system</i>.</p> <p>1.2 Apply OHS requirements relevant to use of organisation's computer system.</p> <p>1.3 Consult designated organisational personnel, as required, for advice and assistance in operating computer systems.</p> <p>1.4 Identify system or operational problems when using the system and notify relevant personnel for resolution.</p>
<b>2 Use computer systems to access, enter and retrieve workplace information.</b>	<p>2.1 Locate, open and use relevant workplace information according to organisational requirements.</p> <p>2.2 Enter relevant workplace data according to organisational requirements.</p> <p>2.3 Produce basic reports as required.</p>
<b>3 Check and edit work, and exit system.</b>	<p>3.1 Check, edit, save, print and file work according to organisational requirements.</p> <p>3.2 Exit and close down the system according to system and organisational procedures.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and report operational problems
- use computers to collect and analyse data
- produce reports and logs
- use literacy skills in regard to verbal and written communication in the workplace
- apply procedures and standards.

#### **Required knowledge:**

- standard operations of computerised information systems
- procedures for retrieving, collecting and monitoring data
- computer-generated information, including reports, documents, files and databases
- organisational requirements and procedures for entering data relevant to position and tasks
- basic workplace reports and forms
- OHS requirements regarding computer use.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should:

- perform each task outlined in the elements consistently and in a representative range of contexts
- meet the performance criteria associated with each element by employing the techniques, procedures, information and resources available in the workplace from those listed in the range statement
- demonstrate an understanding of the underpinning knowledge and the application of skills as described in the required skills and knowledge section.

The candidate should demonstrate the ability to:

- use a variety of software programs relevant to job role
- ensure integrity of software systems, data and information
- start, stop and adjust processes, as required
- complete records and reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the

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assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Operation*** of software systems may include:

- start, stop and adjustment of processes
- maintenance of records and reports on process performance
- creation and maintenance of work plans and work reports.

***Software programs*** will include:

- proprietary commercial software packages for creating, accessing and retrieving data
- in-house developed or 'tailored' software packages.

***Integrity of system*** includes:

- confidentiality of data and information
- appropriate storage and backup of information
- exercising due care with internet and email programs.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Common



# NWP213B Monitor and operate irrigation, stock and domestic delivery systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to operate and check irrigation, stock and domestic supply systems to ensure the delivery of water.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with responsibility for delivering raw water supplies to meet customer orders.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Interpret delivery requirements.</b>	<p>1.1 Plan deliveries according to customer <b><i>orders and schedules</i></b>.</p> <p>1.2 Monitor system <b><i>flow rates or sources</i></b> to ensure orders can be met.</p>
<b>2 Operate irrigation or stock and domestic supply systems.</b>	<p>2.1 Identify and apply organisational requirements, plans, orders and schedules for the operation of irrigation or stock and domestic supply system.</p> <p>2.2 Operate irrigation or stock and domestic supply system according to <b><i>organisational procedures and legislative requirements</i></b>, using safe work methods and appropriate <b><i>equipment</i></b>.</p> <p>2.3 Monitor deliveries, record adjustments and irregularities, and communicate as required.</p>
<b>3 Record and report work activities.</b>	<p>3.1 Identify actual and potential problems that may reduce service standards and communicate to relevant personnel.</p> <p>3.2 Record and report workplace activities according to legislative and organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce basic reports and logs
- operate communications equipment
- give and receives instructions
- follow plans, charts and instructions
- use safety equipment and personal protective equipment
- communicate with customers and other employees
- work effectively as part of a team
- perform work-related calculations
- operate irrigation or stock and domestic supply system
- check channel flow and water deliveries
- use literacy skills in regard to verbal and written communication in the workplace
- identify control system faults.

#### **Required knowledge:**

- impact of the principles of hydraulics on the operation of flows
- layout of drainage or irrigation system
- lock-out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- service requirements specified in customers' contracts
- risk factors and potential hazards involved with water system
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of system, site and plant
- flow measurement procedures
- control systems.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to operate and check irrigation, stock and domestic supply systems to ensure the delivery of water including:

- interpreting irrigation or drainage requirements
- operating, adjusting and monitoring irrigation or drainage system in a given area
- ensuring that water is delivered to schedule
- identifying and reporting problems and irregularities
- completing relevant records and reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Orders and schedules*** for water delivery may require:

- interaction and communication with other employees, other authorities and general public
- meeting customers' contracts or supply orders and requests
- visual and electronic observation
- implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.

***Flow rates or sources*** may include delivery by:

- irrigation channel
- pipeline
- water tanker.

***Organisational procedures and legislative requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment*** used may include:

- personal protective equipment
- hard copy chart recording systems
- mechanical flow usage meters
- basic hand and power tools
- on- and off-road vehicles
- communication equipment
- bar pulling equipment
- computerised equipment.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

## **NWP215B Install and replace basic volumetric metering equipment**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to install and replace basic volumetric metering equipment for domestic, industrial and commercial premises. The unit also includes the identification of defects and the reporting, replacement and adjustment of metering equipment.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff responsible for the effective and accurate operation of water metering equipment as a vital component of service delivery and compliance reporting.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare to install or replace basic volumetric metering equipment.</b>	<p>1.1 Determine work requirements and work site boundaries from specifications or instructions.</p> <p>1.2 Plan work according to job and <i>safety requirements</i> using relevant plans, drawings, standards and technical data.</p> <p>1.3 Select and use electrical safety equipment according to <i>legislative and organisational requirements</i>.</p> <p>1.4 Check coordination issues, including permission to access third-party sites, isolations and permits to work with relevant personnel.</p> <p>1.5 Identify, check and prepare materials, equipment and resources required to satisfy job plan according to organisational requirements.</p> <p>1.6 Identify <i>basic metering equipment</i> and recognise specifications for operation.</p> <p>1.7 Select, fit and use personal protective equipment.</p>
<b>2 Read metering equipment.</b>	<p>2.1 Read meters according to the organisation's operational requirements.</p> <p>2.2 Report readings outside normal parameters and faulty meters and apply organisational procedures for estimating consumption.</p> <p>2.3 Collect and report information on performance metering equipment according to organisational requirements.</p>
<b>3 Finalise work and complete documentation.</b>	<p>3.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational requirements.</p> <p>3.2 Restore work site to meet environmental and organisational requirements.</p> <p>3.3 Maintain compliance reports and relevant workplace records as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- operate communications equipment
- give and receive instructions
- follow plans, charts and instructions
- perform work-related calculations
- use safety equipment and personal protective equipment
- communicate with customers and other employees
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- secure metering devices.

#### **Required knowledge:**

- relevant utilities and service bodies
- organisation's communication systems
- materials handling
- environmental, landscape and ground structure of water and wastewater systems
- risk factors and potential hazards involved with water systems
- equipment operation, capacity and limitations
- effects of weather and conditions on site
- meter types
- equipment placement and operation
- metering measurement procedures
- data collection and recording system
- lock-out procedures for mechanical and electrical installations.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to install and replace basic volumetric metering equipment for domestic, industrial and commercial premises including:

- planning and preparing for installation or replacement of basic volumetric metering equipment
- installing or replacing meters
- reading meters and report faults
- completing reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

## **EVIDENCE GUIDE**

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Safety requirements*** to be considered in planning work include:

- where relevant, meeting requirements to work in confined spaces and at heights
- use of appropriate personal protective equipment
- organisational electrical safety procedures
- adherence to OHS policies, and statutory and regulatory requirements.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Basic metering equipment*** may include:

- domestic
- industrial
- commercial
- volumetric metering equipment.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

## **NWP216B Install basic metering equipment and flow control devices for irrigation systems**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to install meters, flow control and regulating devices for irrigation systems. These installations may occur in ground and surface water source irrigation systems.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff involved in the accurate installation of key water industry metering and flow control devices.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying employability skill requirements.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1Plan and prepare work.</b>	<p>1.1 Apply work requirements for installation of <i>flow control and metering devices</i> in irrigation systems from plans, specifications and instructions.</p> <p>1.2 Prepare work plans to ensure safety within the workplace.</p> <p>1.3 Select and check <i>equipment and tools</i> to meet safety requirements of the task and site.</p> <p>1.4 Select, fit and use personal protective equipment.</p>
<b>2Install flow control devices in irrigation systems.</b>	<p>2.1 Carry out installation of flow control devices in irrigation systems according to manufacturer guidelines and <i>legislative and organisational requirements</i>.</p> <p>2.2 Check that installed flow control devices meet specifications.</p>
<b>3Install metering devices in irrigation systems.</b>	<p>3.1 Carry out installation of flow metering devices in irrigation systems according to manufacturer guidelines and legislative and organisational requirements.</p> <p>3.2 Check that installed metering devices meet specifications.</p>
<b>4Maintain flow control and metering devices in irrigation systems.</b>	<p>4.1 Carry out routine inspections of flow control and metering facilities in irrigation systems according to organisational procedures.</p> <p>4.2 Carry out preventative maintenance and service of equipment and facilities according to manufacturer guidelines and organisational requirements.</p>
<b>5Review, record and report activities.</b>	<p>5.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>5.2 Restore work site to meet environmental and organisational requirements.</p> <p>5.3 Record and report activities according to organisational procedures.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- operate communications equipment
- follow plans, charts and instructions
- perform work-related calculations
- follow procedures and standards
- use safety equipment and personal protective equipment
- communicate with customers and other employees
- work effectively as part of a team
- install flow control devices
- install metering devices
- use literacy skills in regard to verbal and written communication in the workplace
- identify control system or metering faults.

#### **Required knowledge:**

- impact of the principles of hydraulics on the operation of flows
- system layout
- lock-out procedures for mechanical and electrical installations
- organisational communication systems
- effective workplace communication processes
- materials handling
- environmental, landscape and ground structure of work area
- risk factors and potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of system, site and plant
- flow measurement principles and procedures
- layout and performance of pipes and fittings
- operation of control systems.



## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to install meters, flow control and regulating devices for irrigation systems:

- planning and preparing the installation of flow control and metering devices
- interpreting plans, specifications and instructions for installation of flow control devices
- interpreting plans, specifications and instructions for installation of basic metering devices
- conducting routine inspections, maintenance and servicing of basic metering, flow control and regulating devices
- completing relevant workplace documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Flow control and metering devices*** may include:

- flow directional gates
- regulators
- pumping systems, including:
  - centrifugal
  - Archimedes screw type
  - submersible
  - positive displacement
- valving systems, including:
  - sluice
  - gate
  - blade
  - non-return
  - doors, drop structures and bars
- electronic monitoring and metering systems
- mechanical flow usage meters
- Dethridge-type wheels.

***Equipment and tools*** used may include:

- hand and power tools
- on- and off-road vehicles
- lifting and winching equipment
- mechanical excavation equipment
- chemical spraying apparatus
- small marine craft
- personal protective equipment.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

## **Unit Sector(s)**

Not applicable.

## NWP218B Perform and record sampling

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to collect and prepare water and wastewater samples according to legislative and organisational standard operating procedures.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with specific responsibility for collecting grab or composite water samples.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for water quality sampling.</b>	<p>1.1 Confirm required <i>samples</i>, procedures for sampling and sampling locations according to <i>organisational requirements</i>.</p> <p>1.2 Select <i>sampling equipment</i> according to specified samples required and appropriate <i>sample preservation methods</i>.</p> <p>1.3 Identify, check and prepare materials, equipment and resources required to satisfy job plan according to organisational requirements.</p> <p>1.4 <i>Plan sampling work activities</i> to comply with sampling plan and organisational requirements.</p>
<b>2 Conduct water quality sampling.</b>	<p>2.1 Collect samples ensuring that sample types, <i>sampling locations</i> and sampling times comply with sampling plan.</p> <p>2.2 Maintain integrity of samples during sampling and label sample containers according to organisational requirements.</p> <p>2.3 Follow approved safety procedures to limit hazards and contamination to self, work area and environment.</p>
<b>3 Record sampling data.</b>	<p>3.1 <i>Record</i> required information according to legislative and organisational requirements.</p> <p>3.2 Report observations or measurements outside organisational guidelines or specifications for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- prepare, collect, label and preserve water samples
- dispose of waste and spent samples correctly
- produce reports and logs
- plan work activities
- work effectively as part of a team
- perform task-related calculations
- identify and obtain resources
- follow plans and instructions
- apply procedures and standards
- communicate work requirements
- use literacy skills in regard to verbal and written communication in the workplace
- use personal protective equipment.

#### **Required knowledge:**

- types and purposes of water samples
- procedures and techniques for water sampling
- water sample preparation, including:
  - prevention of contamination
  - volume of sample
  - appropriate containers
  - preservation
  - location selection
  - location maintenance
  - equipment
  - transportation
- documentation procedures for water samples
- disposal procedures for waste and excess water samples
- task-related calculations
- legislative and organisational policies, procedures and standards
- communication systems
- work planning processes
- effects of weather and conditions on work
- hazards associated with collection of water samples.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to perform basic water sampling by:

- planning and preparing for water sampling tasks
- collecting samples according to sampling plan
- maintaining integrity of water samples
- recording all required information.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based



## **EVIDENCE GUIDE**

activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Samples*** may include:

- grab, composite or flow-weighted composite samples for:
- microbiological testing
- testing for chemical and physical characteristics.

***Organisational requirements*** may include:

- standard operating procedures
- Australian standards, for example AS/NZS 5667 Water quality - sampling
- state Environment Protection Authority sampling guidelines
- legislative requirements
- OHS.

***Sampling equipment*** may include:

- buckets or wide-mouthed containers
- depth samplers
- sample dippers
- sterile sample containers:
- plastic
- glass
- test-specific, such as acid washed
- weighted sample bottles
- dip tubes
- composite and discrete automatic samplers.

***Sample preservation methods*** may include:

- refrigeration
- freezing
- chemical addition, such as acidification
- shielding from direct sunlight
- filtration.

***Planning sampling work activities*** may include:

- interpretation of instructions and directions
- timelines
- interaction and communication with team members and individuals
- customer service requirements.

***Sampling locations*** may include:

- raw water supply, including:
- surface water
- groundwater
- water distribution and treatment systems

## **RANGE STATEMENT**

*Records* may include:

- wastewater collection and treatment systems.
- sample records, field detail sheets or chain of custody forms, including information such as:
  - time sample was taken
  - details of person collecting sample
  - sample point
  - volume of sample
  - data gathered at time of collection
  - pre-treatment
  - preservation
  - instructions to transporters.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Common

## NWP219A Work safely in confined spaces

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to work safely in confined spaces in the water industry. Working in confined spaces poses specific health and safety risks and the ability to follow defined workplace policies and procedures, OHS policies and procedures and regulatory requirements are essential for safe practice.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff within the water industry who are required to work safely in confined spaces.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Assess confined space for entry.</b>	1.1 Check OHS manuals, standard workplace instructions and policies dealing with working in <i>confined spaces</i> . 1.2 Confirm purpose for entry to confined space. 1.3 Conduct <i>risk assessment</i> of confined space access activity and document according to organisational, legislative and regulatory requirements. 1.4 Review established emergency procedures to be put in place as required.
<b>2 Plan and prepare for entry.</b>	2.1 Identify <i>workplace procedures and work instructions</i> for controlling risks in confined spaces and use to plan entry. 2.2 Record on entry permit <i>safety equipment and personal protective equipment</i> to be used. 2.3 Conduct isolation procedures prior to entry when appropriate to planned entry. 2.4 Conduct atmospheric assessment of confined space and record results on entry permit. 2.5 Set up and locate equipment specified on entry permit. 2.6 Confirm communication and emergency response procedures with the stand-by person. 2.7 Complete and process entry permit authorising entry to confined space following required procedures.
<b>3 Enter confined space safely.</b>	3.1 Select, fit and use personal protective equipment specified on entry permit. 3.2 Ensure entry permit is signed prior to entering confined space. 3.3 Ensure entry to confined space is controlled according to requirements specified in entry permit. 3.4 Continue atmospheric monitoring while the confined space is occupied. 3.5 Maintain communication with stand-by person and confined space entry personnel. 3.6 Complete task to be undertaken in confined space according to organisational procedures and safe work practices.
<b>4 Conclude confined space operations.</b>	4.1 Ensure confined space is evacuated and sign-out is completed on entry permit. 4.2 Ensure signature of authorised person on entry permit is gained at completion of operations. 4.3 Ensure confined space entry equipment is cleaned, examined and stored according to manufacturer and organisational requirements.

**ELEMENT**

**PERFORMANCE CRITERIA**

4.4 Ensure confined space is secured according to organisational requirements.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- work in accordance with risk assessments and entry permits
- apply relevant Australian and New Zealand standard AS/NZS 2865: 2001 Safe Working in Confined Spaces
- perform work-related calculations
- identify and control hazards in confined spaces
- fit personal protective equipment
- conduct atmospheric assessments with electronic gas detector
- maintain equipment
- prepare space for entry
- access, interpret and apply relevant legislative responsibilities
- identify and report hazards
- communicate effectively in the workplace
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- complete relevant workplace records and reports.

#### **Required knowledge:**

- types of confined spaces encountered in the water industry
- organisational procedures for confined space entry
- safe systems of work
- use of equipment for confined space entry
- hazards to health and safety in confined spaces
- hazard identification procedures
- OHS requirements for confined space entry
- atmospheric hazards and assessment methods
- site and equipment safety requirements
- isolation procedures
- lock-out and tag-out procedures
- first aid
- emergency 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to work safely in confined spaces by:

- planning work in confined spaces effectively
- identifying and using specified and required safety equipment
- applying entry permit process accurately and according to specified procedures
- applying OHS requirements in relation to working in confined spaces within the water industry
- assessing risks
- working effectively with team members and in particular the stand-by person
- conducting air monitoring procedures
- working effectively within confined spaces to complete required tasks
- completing work and exiting confined space
- completing required documentation
- handling, cleaning and maintaining equipment effectively and according to standard operating procedures.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

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experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Confined spaces*** may include:

- water pipe systems and tunnels
- access chambers, manholes and shafts
- valve pits and sumps
- live or inactive sewer mains
- wastewater pump wells
- tanks, such as water and chemical storage, digesters and filter cells
- stormwater systems and environmental traps
- trenches.

***Risk assessment*** of the confined space access activity may include analysis of:

- restricted means of entry and exit
- atmosphere that contains potentially harmful levels of contaminants
- unsafe oxygen levels
- engulfment hazards and need for hydraulic isolation
- working with hazardous equipment and materials
- working in hot or cold conditions
- working in high places.

***Workplace procedures and work instructions*** may include:

- application of entry permit procedures
- hazard policies and procedures
- emergency, engulfment, fire and accident procedures
- procedures for the use of personal protective clothing and equipment
- hazard identification and issue resolution procedures
- job procedures and work instructions.

***Safety equipment and personal protective equipment*** will vary according to nature of work undertaken but may include:

- self-rescue respiratory protection devices
- self-contained compressed air breathing apparatus
- supplied airline breathing apparatus and escape breathing apparatus
- atmospheric monitoring devices
- harness and lifeline
- fall arrest and winching system
- ventilation equipment
- signs
- barricades

## **RANGE STATEMENT**

- communication devices
- tools and equipment relevant to work to be performed
- waterproof overalls
- non-slip safety footwear
- hard hat
- protective gloves.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Common

## NWP220B Collect and control drainage run-off

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to collect, monitor, manage and re-use drainage run-off surplus water.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with specific responsibility for collecting, monitoring and managing stormwater drainage run-off.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare work.</b>	<p>1.1 Program work requirements for collecting and controlling drainage assets according to <b><i>relevant legislation and organisational procedures</i></b>.</p> <p>1.2 Select and check <b><i>equipment and tools</i></b> required to meet safety requirements of task and site.</p> <p>1.3 Select, fit and use personal protective equipment.</p>
<b>2 Monitor drainage assets.</b>	<p>2.1 Identify and define designated work areas to be inspected using organisational plans and data.</p> <p>2.2 Conduct and report routine inspections of <b><i>drainage networks and storage facilities</i></b> according to organisational requirements.</p>
<b>3 Monitor quality and flow.</b>	<p>3.1 Collect water samples and record and report according to organisational requirements.</p> <p>3.2 Operate flow regulation devices to achieve discharge and diversion of drainage waters to meet customer and organisational requirements.</p> <p>3.3 Inspect and test flow regulation devices and report operational condition according to legislative and organisational requirements.</p>
<b>4 Manage and re-use drainage water.</b>	<p>4.1 Produce data relating to system adjustment according to organisational policies and statutory requirements.</p> <p>4.2 Manage drainage storage facilities according to customer and organisational requirements.</p> <p>4.3 Implement drainage re-use and report according to organisational requirements.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify and respond to operational problems
- collect and analyse data
- produce reports and logs
- use safety equipment and personal protective equipment
- use tools and machinery
- interpret plans, charts, diagrams and instructions
- perform work-related calculations
- apply procedures and standards
- communicate with employees and customers
- work effectively as part of a team
- use communication equipment
- use literacy skills in regard to verbal and written communication in the workplace
- give and receive instructions.

#### Required knowledge:

- use of sediment and erosion control devices
- impact of principles of hydraulics on operation of flows
- organisation's system layout
- environmental aspects of maintenance
- construction processes
- sampling and testing procedures
- relevant utilities and service providers
- communication systems
- hazardous materials handling
- landscape and ground structure of work area
- risk factors and potential hazards of construction and maintenance processes
- equipment operation, capacity and limitations
- effects of weather and conditions on construction site or plant
- organisation's control systems
- pre-cast components
- pipes and fittings
- chemical usage.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to collect, monitor, manage and re-use drainage run-off surplus water including:

- planning and preparing for monitoring, collecting, controlling and re-using drainage run-off
- inspecting drainage assets
- monitoring and adjusting flows
- managing drainage water re-use
- completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be



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authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Relevant legislation and organisational procedures*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment and tools*** may include:

- hand and power tools
- on- and off-road vehicles
- lifting and winching equipment
- mechanical excavation equipment
- compressors
- pneumatic spaders and attachments
- motorised cutting equipment
- chemical spraying apparatus
- small marine craft
- trenching systems
- portable pumps
- communication equipment
- breathing apparatus
- gas detection equipment
- rescue equipment
- appropriate personal protective equipment.

***Drainage networks and storage facilities*** include infrastructure, such as:

- structures, including:
  - channels
  - drains
  - meter pits
  - access chambers
  - collection chambers
  - drop structures
  - regulators
  - erosion barriers
  - anti-pollution devices

## **RANGE STATEMENT**

- grates
- head walls
- pipes, including:
  - vitrified clay
  - polyvinyl chloride (PVC)
  - polyethylene
  - reinforced concrete
  - ductile iron cement lined
  - cast iron cement lined
  - glass reinforced piping
- prefabricated sections, including:
  - drainage sections
  - drainage pits
  - culverts
  - under road crossovers
  - person access pits
  - siphons
  - meter outlets
- fittings, including:
  - jointing systems for pipe types and prefabricated sections, e.g. gibault and tension bands
  - solvent cement joints
  - compression rings
  - bolted flanges
  - malleable jointing materials
  - electrofusion
  - butt welding.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## **NWP221A Operate basic flow control and regulating devices in water or wastewater treatment network systems**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to operate basic flow control and regulating devices in water or wastewater treatment network systems.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with responsibility for using flow control and metering devices according to organisational procedures.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor required flows in water or wastewater treatment network systems.</b>	<p>1.1 Apply operating parameters and requirements for flows in water or wastewater treatment network systems.</p> <p>1.2 Use <b><i>equipment</i></b> to support the monitoring process in water or wastewater treatment network systems according to OHS, organisational and manufacturer requirements.</p> <p>1.3 <b><i>Monitor, measure and record</i></b> flows at <b><i>designated locations and systems</i></b> according to agreed schedule and procedures.</p> <p>1.4 Identify potential operational problems in water or wastewater treatment network systems and provide proactive advice to relevant personnel.</p>
<b>2 Regulate flows in water or wastewater treatment network systems.</b>	<p>2.1 Adjust <b><i>flow regulation</i></b> and control mechanisms in water or wastewater treatment network systems to increase and decrease flow according to organisational procedures.</p> <p>2.2 Secure flow regulation devices in water or wastewater treatment network systems to maintain a constant flow and meet <b><i>legislative and organisational requirements</i></b>.</p>
<b>3 Record and report system adjustments.</b>	<p>3.1 Produce information relating to flow adjustments in water or wastewater treatment network systems according to organisational procedures.</p> <p>3.2 Collect, record and report information on flows and abnormalities in water or wastewater treatment network systems according to organisational requirements.</p>
<b>4 Respond to contingencies.</b>	<p>4.1 Identify and assess potential risks and contingencies in operation of flow control and regulating devices within water or wastewater treatment systems.</p> <p>4.2 Identify and apply organisational standards and procedures for responding to potential and actual risks and contingencies.</p> <p>4.3 Apply organisational standards and procedures for informing relevant personnel of potential risks within the organisation.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- collect and report system performance information
- adjust and maintain flow system control mechanisms
- secure flow regulation devices
- use literacy skills in regard to verbal and written communication in the workplace
- use personal protective equipment.

#### **Required knowledge:**

- impact of the principles of hydraulics on the operation of flows
- system layout
- role of relevant utilities and service bodies
- risk factors and potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of system and site
- system flow control mechanisms
- relevant lock-out procedures for mechanical and electrical installations.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability in water and wastewater treatment network systems to:

- identify flow requirements
- prepare for and conduct flow monitoring
- identify and report operational problems
- adjust and regulate flows according to organisational requirements
- complete records and reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

## EVIDENCE GUIDE

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Equipment*** used includes:

- personal protective equipment
- electronic digital monitoring and metering systems
- basic hand and power tools
- valves, pumps and flow meters
- mechanical meters and flow devices
- hydrants
- recording systems
- communication equipment, including:
  - two-way radio
  - telephone
  - fax
- lifting and winching equipment
- on- and off-road vehicles.

Processes to ensure flows are ***monitored, measured and recorded*** may require:

- interaction and communication with other employees, other authorities and general public
- visual observation
- implementation of reporting procedures that may also include procedures for implementation of by-laws, organisational policies and statutory requirements.

***Designated locations and systems*** may include:

- urban locations
- rural locations
- ground and surface water source systems
- wastewater collection and transfer systems
- trade waste systems.

***Flow regulation*** may involve operation of:

- valving systems, including:
  - sluice
  - blade
  - gate
  - non-return
  - pressure reducing
- supervisory control and data acquisition (SCADA) systems
- pumping systems, including:
  - centrifugal

## RANGE STATEMENT

- Archimedes screw type
  - submersible
  - positive displacement
  - electronic and manual controlling systems
  - service reservoirs.
  - relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development agreements, such as land care agreements.
- Legislative and organisational requirements* may include:

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

## **NWP222A Operate basic flow control and regulating devices in irrigation systems**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to operate basic flow control and regulating devices in irrigation systems.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with responsibility for using flow control and metering devices according to organisational procedures.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor required flows in irrigation systems.</b>	<p>1.1 Access and apply operating parameters and requirements for flows in irrigation systems.</p> <p>1.2 Use <b><i>equipment</i></b> to support monitoring process in irrigation systems according to OHS, organisational and manufacturer requirements.</p> <p>1.3 <b><i>Monitor, measure and record</i></b> flows at <b><i>designated locations and systems</i></b> according to agreed schedule and procedures.</p> <p>1.4 Identify potential operational problems in irrigation systems and provide proactive advice to relevant personnel.</p>
<b>2 Regulate flows in irrigation systems.</b>	<p>2.1 Adjust <b><i>flow regulation</i></b> and control mechanisms in irrigation systems to increase and decrease flow according to organisational procedures.</p> <p>2.2 Secure flow regulation devices in irrigation systems to maintain a constant flow and meet <b><i>legislative and organisational requirements</i></b>.</p>
<b>3 Record and report system adjustments.</b>	<p>3.1 Produce information relating to flow adjustments in irrigation systems according to organisational procedures.</p> <p>3.2 Collect, record and report information on flows and abnormalities in irrigation systems according to organisational requirements.</p>
<b>4 Respond to contingencies.</b>	<p>4.1 Identify and assess potential risks and contingencies in the operation of flow control and regulating devices within irrigation systems.</p> <p>4.2 Identify and apply organisational standards and procedures for responding to potential and actual risks and contingencies.</p> <p>4.3 Apply organisational standards and procedures for informing relevant personnel within organisation of potential risks.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- collect and report system performance information
- adjust and maintain flow system control mechanisms
- secure flow regulation devices
- use literacy skills in regard to verbal and written communication in the workplace
- use personal protective equipment.

#### **Required knowledge:**

- impact of the principles of hydraulics on the operation of flows
- system layout
- role of relevant utilities and service bodies
- risk factors and potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of system and site
- system flow control mechanisms
- relevant lock-out procedures for mechanical and electrical installations.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to operate basic flow control and regulating devices in irrigation systems including:

- identifying flow requirements
- preparing for and conducting flow monitoring
- identifying and reporting operational problems
- adjusting and regulating flows according to organisational requirements
- completing records and reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Equipment*** used includes:

- personal protective equipment
- electronic digital monitoring and metering systems
- basic hand and power tools
- valves, pumps and flow meters
- mechanical meters and flow devices
- hydrants
- recording systems
- communication equipment, including:
  - two-way radio
  - telephone
  - fax
- lifting and winching equipment
- on- and off-road vehicles.

Processes to ensure flows are ***monitored, measured and recorded*** may require:

- interaction and communication with other employees, other authorities and general public
- visual observation
- implementation of reporting procedures that may also include procedures for implementation of by-laws, organisational policies and statutory requirements.

***Designated locations and systems*** may include:

- urban locations
- rural locations
- ground and surface water source systems
- wastewater collection and transfer systems
- trade waste systems.

***Flow regulation*** may include operation of:

- valving systems, including:
  - sluice
  - blade
  - gate
  - non-return
  - pressure reducing
- supervisory control and data acquisition (SCADA) systems
- pumping systems, including:
  - centrifugal



## RANGE STATEMENT

*Legislative and organisational requirements* may include:

- Archimedes screw type
- submersible
- positive displacement
- electronic and manual controlling systems
- service reservoirs.
- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

## **NWP223A Install basic metering equipment, flow control and regulating devices**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to install meters, flow control and regulating devices for water distribution or wastewater collection systems.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff involved in the accurate installation of key water industry metering and flow control devices.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare work.</b>	1.1 Determine work requirements for installation of <i>flow control and metering devices</i> in water distribution or wastewater collection systems from plans, specifications and instructions. 1.2 Prepare work plans to ensure safety within workplace. 1.3 Select and check <i>equipment and tools</i> to meet safety requirements of task and site. 1.4 Select, fit and use personal protective equipment.
<b>2 Install flow control devices.</b>	2.1 Carry out installation of flow control devices in water distribution or wastewater collection systems according to manufacturer guidelines and <i>legislative and organisational requirements</i> . 2.2 Check that flow control devices meet specifications.
<b>3 Install metering devices.</b>	3.1 Carry out installation of metering devices in water distribution or wastewater collection systems according to manufacturer guidelines and legislative and organisational requirements. 3.2 Check that installed metering devices meet specifications.
<b>4 Maintain flow control and metering devices in water distribution or wastewater collection systems.</b>	4.1 Carry out routine inspections of flow control and metering facilities in water distribution or wastewater collection systems according to organisational procedures. 4.2 Carry out preventative maintenance and service of equipment and facilities according to manufacturer guidelines and organisational requirements.
<b>5 Review, record and report activities.</b>	5.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures. 5.2 Restore work site to meet environmental and organisational requirements. 5.3 Record and report activities according to organisational procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- operate communications equipment
- follow plans, charts and instructions
- perform work-related calculations
- follow procedures and standards
- use safety equipment and personal protective equipment
- communicate with customers and other employees
- work effectively as part of a team
- install flow control devices
- install metering devices
- use literacy skills in regard to verbal and written communication in the workplace
- identify control system and metering faults.

#### **Required knowledge:**

- impact of the principles of hydraulics on the operation of flows
- system layout
- lock-out procedures for mechanical and electrical installations
- organisational communication systems
- effective workplace communication processes
- materials handling
- environmental, landscape and ground structure of work area
- risk factors and potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of system, site and plant
- flow measurement principles and procedures
- layout and performance of pipes and fittings
- operation of control systems.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to install meters, flow control and regulating devices for water distribution or wastewater collection systems including:

- planning and preparing for installation of flow control and metering devices
- interpreting plans, specifications and instructions for installation of flow control devices
- interpreting plans, specifications and instructions for installation of basic metering devices
- conducting routine inspections, maintenance and servicing of basic metering, flow control and regulating devices
- completing relevant workplace documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

## EVIDENCE GUIDE

experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Flow control and metering devices*** may include:

- flow directional gates
- regulators
- pumping systems, including:
  - centrifugal
  - Archimedes screw type
  - submersible
  - positive displacement
- valving systems, including:
  - sluice
  - gate
  - blade
  - non-return
  - doors, drop structures and bars
- electronic monitoring and metering systems
- mechanical flow usage meters
- Dethridge-type wheels.

***Equipment and tools*** used may include:

- hand and power tools
- on- and off-road vehicles
- lifting and winching equipment
- mechanical excavation equipment
- chemical spraying apparatus
- small marine craft
- personal protective equipment.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.



**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Collection and distribution

## NWP226B Prepare and restore work site

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to prepare work sites prior to work and restore them on completion of work. The ability to follow work instructions, use a range of equipment and tools to prepare a safe work site and subsequently to restore the site to the required condition is essential to satisfactory performance.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff performing a wide range of functions that support construction, maintenance and operations processes.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	<p>1.1 Determine <b><i>site preparation</i></b> requirements from specifications, instructions and pre-work inspections.</p> <p>1.2 Identify and report potential risks to public and environment.</p> <p>1.3 Perform a site check according to <b><i>legislative and organisational requirements</i></b> to identify risks and prevent damage to other utilities.</p> <p>1.4 Select and check work site <b><i>equipment, tools and materials</i></b> as appropriate to meet task and safety specifications.</p> <p>1.5 Select, fit and use personal protective equipment.</p>
<b>2 Prepare work site.</b>	<p>2.1 Position <b><i>safety equipment and materials</i></b> as required to prevent potential risks to public and environment.</p> <p>2.2 <b><i>Store and secure equipment</i></b> and materials as necessary.</p> <p>2.3 Use work site equipment, tools and materials according to regulatory and legislative requirements.</p> <p>2.4 Use manual or mechanical excavation equipment where required to achieve specifications.</p> <p>2.5 Provide appropriate drainage and diversion of site inflows from work site without <b><i>damage to environment</i></b>.</p>
<b>3 Restore work site.</b>	<p>3.1 Use equipment, tools and materials according to regulatory and legislative requirements.</p> <p>3.2 Backfill and compact excavations according to specifications.</p> <p>3.3 Remove excess soil, debris and unwanted materials from site.</p> <p>3.4 <b><i>Restore work site</i></b> to meet environmental and organisational requirements.</p>
<b>4 Review, record and report activities.</b>	<p>4.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>4.2 Maintain workplace records as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- set up a site
- excavate backfill
- compact and reinstate site
- prepare site for planting and plant vegetation
- interpret plans, instructions and standard operating procedures
- use tools and equipment
- identify and respond to operational problems
- use communication systems
- use safety equipment and personal protective equipment
- identify hazards
- give and receive instructions
- use literacy skills in regard to verbal and written communication in the workplace
- communicate with customers and other employees.

#### **Required knowledge:**

- OHS procedures
- personal work site safety
- public and site safety
- risk factors and potential hazards of site preparation and restoration
- environmental aspects of site preparation and restoration
- trenching, shoring and excavation management
- excavation procedures and site restoration
- relevant utilities and service bodies
- communication systems
- landscape and ground structure of work area
- equipment operation, capacity and limitations
- effects of weather and conditions on construction site or plant.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to prepare work sites prior to work and restore them on completion of work including:

- interpreting work requirements
- planning work site layout
- selecting appropriate work and safety equipment
- storing and securing materials and equipment safely
- clearing and preparing work site according to specifications
- restoring work site according to environmental and organisational procedures
- cleaning, maintaining and storing equipment
- completing relevant workplace documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Site preparation*** may include:

- interpreting plans
- locating public utilities
- setting out site
- battering
- shoring
- scaffolding
- excavating
- directing traffic and the public.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment, tools and materials*** may include:

- hand and power tools
- lifting and winching equipment
- mechanical excavation equipment
- pneumatic and motorised equipment, including:
  - compressors
  - pneumatic spades and attachments
  - motorised cutting equipment
- revegetation and gardening supplies and plants
- communication equipment
- personal protective equipment.

***Safety equipment and materials*** may be used to ensure public and site safety when:

- positioning signs
- erecting barricades
- controlling access.

***Storing and securing equipment*** may include:

- stacking and securing pipes safely
- placing equipment in locked storage during absence from site.

***Damage to environment*** is

- sediment control devices

## **RANGE STATEMENT**

avoided or minimised by using a range of techniques, including:

- erosion prevention
- diversion and collection structures.

*Restore work site* using techniques, including:

- backfilling
- compacting
- planting or replanting vegetation
- reinstating site.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Common



## NWP227B Control vegetation on a site

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to control vegetation on a site by inspecting, identifying and treating weeds, plants and shrubs. The ability to plan and undertake work safely, including the safe handling of chemicals and equipment, is essential to performance.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff involved in plant control but it does not reflect the requirements for undertaking plant control on the properties of third parties where further training and licensing requirements may apply.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare work.</b>	<p>1.1 Plan work according to work specifications, <b><i>relevant legislation and organisational procedures</i></b>.</p> <p>1.2 Perform site check according to organisational requirements to prevent damage to other utilities and environment.</p> <p>1.3 Select and check <b><i>equipment and personal protective equipment</i></b> and material safety data sheets to meet safety requirements of task and site.</p> <p>1.4 Identify noxious weeds, plants and shrubs.</p>
<b>2 Treat vegetation.</b>	<p>2.1 Conduct monitoring programs to determine spread, growth rate and extent of problem caused by weeds.</p> <p>2.2 Store, handle, transport and mix chemicals and other control mechanisms according to relevant legislation and organisational procedures.</p> <p>2.3 Use <b><i>processes</i></b> to treat vegetation in a manner safe to all stakeholders and according to appropriate standards and organisational operational procedures.</p> <p>2.4 Implement controls according to organisational requirements to minimise environmental damage and deal with emergencies and spillage.</p>
<b>3 Check work and restore work site.</b>	<p>3.1 Clean equipment after use and prepare for safe storage or re-use.</p> <p>3.2 Identify potential hazards and dispose of waste according to organisational requirements.</p>
<b>4 Complete records and reports.</b>	<p>4.1 Record use of chemicals and control mechanisms according to legislative and organisational requirements.</p> <p>4.2 Complete work reports and documentation as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and report operational problems
- produce reports and logs
- use personal protective equipment
- use tools and machinery
- use chemicals and other treatments
- follow plans, charts and instructions
- perform work-related calculations
- interpret material safety data sheets (MSDS)
- apply procedures and standards
- communicate with employees and customers
- work effectively as part of a team
- use communication equipment
- use literacy skills in regard to verbal and written communication in the workplace
- give and receive instructions.

#### **Required knowledge:**

- environmental aspects of controlling vegetation
- relevant utilities and service bodies
- communication systems
- use, storage, handling and transport of hazardous substances
- landscape and ground structure of work area
- risk factors and potential hazards of vegetation control processes
- equipment operation, capacity and limitations
- effects of weather and conditions on use of chemical treatment, site or plant
- control systems
- materials handling
- landscape and ground structure of work area.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to control vegetation on a site by inspecting, identifying and treating weeds, plants and shrubs including:

- interpreting work requirements from given documentation
- identifying noxious weeds and appropriate control methods
- planning and preparing equipment and materials required for work
- treating vegetation according to legislative and organisational procedures
- identifying risks and implement controls
- restoring work site according to environmental and organisational requirements
- completing relevant documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's

## EVIDENCE GUIDE

- competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
  - where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
  - assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Relevant legislation and organisational procedures*** include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment and personal protective equipment*** may include:

- hand and power tools
- on- and off-road vehicles
- lifting and winching equipment
- mechanical excavation equipment
- chemicals and mixers
- chemical spraying apparatus
- mixing equipment and storage areas
- communication equipment
- gas detection equipment
- rescue equipment
- breathing apparatus
- other appropriate personal protective equipment, including goggles and gloves.

***Processes*** used to treat and control vegetation include:

- application of chemicals
- manual extraction
- use of genetic plant modification
- companion planting
- other environmental controls, including use of insects.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field    Common

## NWP229B Repair minor structures

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to construct and repair minor structural assets of the water industry, such as meter pits, erosion barriers and small weirs.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with specific responsibility for ensuring that small structural assets are constructed and repaired in a safe and timely manner.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare repair work.</b>	<p>1.1 Determine work requirements from plans, specifications and instructions.</p> <p>1.2 Select and check <i>formwork, materials and equipment</i> required to ensure that safety requirements of task and site are met.</p> <p>1.3 Select, fit and use personal protective equipment.</p> <p>1.4 Conduct appropriate utility location activities prior to excavation according to <i>legislative and organisational requirements</i>.</p> <p>1.5 Arrange appropriate site boundary protection according to organisational requirements.</p>
<b>2 Repair minor structures.</b>	<p>2.1 Inspect structures and determine appropriate <i>repair techniques</i>.</p> <p>2.2 Apply appropriate repair techniques according to manufacturer guidelines and legislative and organisational requirements.</p>
<b>3 Complete and record work outcomes.</b>	<p>3.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>3.2 Restore work site to meet environmental and organisational requirements.</p> <p>3.3 Complete workplace records and process as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- undertake minor repairs to structures
- interpret plans, instructions and standard operating procedures
- follow procedures and standards
- use safety equipment and personal protective equipment
- use tools and machinery
- lay concrete
- insert water stop or seal
- identify hazards
- perform work-related calculations
- give and receive instructions
- work effectively as part of a team
- communicate with customers and other employees
- use literacy skills in regard to verbal and written communication in the workplace
- apply lock-out and tag-out procedures.

#### **Required knowledge:**

- OHS procedures
- personal work site safety procedures
- construction calculations
- risk factors and potential hazards of minor structure construction and maintenance
- equipment operation
- formwork preparation and positioning
- methods of repairing concrete, brick and stone structures
- concrete placement techniques, including compaction
- water to cement ratio of concrete.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to repair work on minor structural assets of the water industry including:

- planning and preparing work site
- performing repair tasks according to manufacturer specifications and organisational requirements
- checking work, restoring work site, storing equipment and completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

## **EVIDENCE GUIDE**

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Formwork, materials and equipment*** may include:

- formwork, such as:
  - steel formwork
  - timber formwork
- equipment, such as:
  - personal protective equipment
  - hand and power tools
  - ties
  - chains
  - props
  - jacks
  - drainage aggregate
  - pipes
  - lifting and winching equipment
  - mechanical excavation equipment
  - pneumatic and motorised equipment, including:
    - compressors
    - pneumatic spades and attachments
    - motorised cutting equipment
  - cable ways
  - travellers
  - gauging stations
  - small control weirs
  - communication equipment.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Repair techniques*** may include:

- quick-set cement
- cementitious materials
- proprietary equipment.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Common

# NWP230B Maintain and repair irrigation channels and drains

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to maintain and repair irrigation or stock and domestic supply channels and drains.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with responsibility for carrying out planned and emergency maintenance and repair work on raw water delivery systems.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare work site.</b>	<p>1.1 Determine <b><i>work requirements</i></b> from plans, drawings, specifications or instructions.</p> <p>1.2 Make appropriate drainage and inflow diversion arrangements without damage to environment.</p> <p>1.3 Select and check <b><i>equipment</i></b> and excavation methods to meet safety requirements of task and site.</p>
<b>2 Maintain irrigation channels, drains and associated fittings.</b>	<p>2.1 Conduct routine inspections of designated work areas according to maintenance schedules.</p> <p>2.2 Identify <b><i>system faults</i></b> and apply corrective action according to structure type, location, specification and <b><i>legislative and organisational requirements</i></b>.</p> <p>2.3 Identify, select, place and join <b><i>components and associated fittings</i></b> according to manufacturer specifications and organisational requirements.</p> <p>2.4 Construct cast in situ components according to specifications and organisational requirements.</p> <p>2.5 Repair earthworks and embankments to meet organisational requirements.</p>
<b>3 Check work and restore work site.</b>	<p>3.1 Check repaired or replaced components and earthworks to ensure that specifications have been met.</p> <p>3.2 Backfill, compact and restore work site to meet environmental and organisational requirements.</p>
<b>4 Finalise work.</b>	<p>4.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>4.2 Complete workplace records and process as required.</p>



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- lay concrete
- insert water stop or seal
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- interpret plans, charts and instructions
- perform work-related calculations
- apply procedures and standards
- work effectively as part of a team
- communicate with employees and customers
- use communication equipment
- use literacy skills in regard to verbal and written communication in the workplace
- give and receive instructions.

#### **Required knowledge:**

- environmental aspects of maintenance
- construction processes
- concrete placement techniques, including compaction
- water to cement ratio of concrete
- relevant utilities and service providers
- communication systems
- work-related calculations
- hazardous materials handling
- landscape and ground structure of work area
- backfilling and compaction requirements
- risk factors and potential hazards of maintenance processes
- effects of weather and conditions on construction site or plant
- control systems
- recording and reporting systems
- pre-cast components
- pipes and fittings
- chemical usage.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to conduct maintenance and repair work on irrigation drains and channels by:

- planning and preparing work site
- inspecting irrigation drains and channels and identifying faults
- performing maintenance and repair tasks according to manufacturer specifications and organisational requirements
- checking work, restoring work site, storing equipment and completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- selection and correct use of safety and personal protective equipment
- site boundaries
- boundary protection
- extent of work
- safe work methods
- job work orders
- hazard identification, such as damage to other utilities.

***Equipment*** used may include:

- hand and power tools
- on- and off-road vehicles
- lifting and winching equipment
- mechanical excavation equipment
- compressors
- pneumatic spaders and attachments
- motorised cutting equipment
- chemical spraying apparatus
- small marine craft
- trenching systems
- portable pumps
- communication equipment
- breathing apparatus
- gas detection equipment
- rescue equipment
- appropriate personal protective equipment.

***System faults*** may include:

- unapproved works and connections
- exfiltration
- contamination.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development

## RANGE STATEMENT

*Components and associated fittings* may include:

- agreements, such as land care agreements.
- controlling equipment
- channels
- pipes
- metered or unmetered outlets
- regulators
- prefabricated channel components
- collection and person access chambers
- meter pits
- drop structures
- erosion barriers
- head walls
- pipes, including:
  - vitrified clay
  - polyvinyl chloride (PVC)
  - polyethylene
  - reinforced concrete
  - glass reinforced piping
  - ductile iron cement lined
  - cast iron cement lined
- fittings, including:
  - jointing systems for pipe types and prefabricated sections, e.g. gibault and tension bands
  - solvent cement joints
  - compression rings
  - bolted flanges
  - malleable jointing materials
  - electrofusion
  - butt welding.

## Unit Sector(s)

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## NWP231B Maintain and repair drainage assets

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to conduct maintenance and repair activities on drainage assets.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with specific responsibility for ensuring that drainage asset maintenance and repair are completed in a safe and timely manner.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	1.1 Determine <i>work requirements</i> from plans, drawings, specifications or instructions. 1.2 Check site and identify <i>hazards</i> according to <i>legislative and organisational requirements</i> . 1.3 Make appropriate drainage and inflow diversion arrangements without damage to environment. 1.4 Select and check <i>equipment</i> and excavation methods to meet safety requirements of task and site. 1.5 Select, fit and use personal protective equipment.
<b>2 Maintain drainage assets.</b>	2.1 Conduct routine inspections to determine <i>asset</i> condition and operational capacity according to organisational requirements. 2.2 Conduct preventative maintenance according to organisational maintenance programs. 2.3 Repair damaged components according to specification, location and organisational requirements. 2.4 Remove debris, silt and obstructions according to legislative and organisational requirements. 2.5 Select, place and join prefabricated drain sections according to manufacturer specifications and legislative and organisational requirements. 2.6 Construct cast in situ components according to specifications and legislative and organisational requirements. 2.7 Check repaired and replaced components to ensure that specifications have been met.
<b>3 Finalise work.</b>	3.1 Backfill, compact and restore work site to meet environmental and organisational requirements. 3.2 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures. 3.3 Complete workplace records and process as required.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- complete records and logs
- use safety equipment and personal protective equipment
- use tools and machinery
- lay concrete
- insert water stop or seal
- work effectively as part of a team
- perform work-related calculations
- interpret plans, charts and instructions
- use literacy skills in regard to verbal and written communication in the workplace
- apply procedures and standards.

#### **Required knowledge:**

- system layout
- environmental aspects of maintenance
- construction processes
- concrete placement techniques, including compaction
- water to cement ratio of concrete
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- landscape and ground structure of work area
- risk factors and potential hazards of construction processes
- equipment operation, capacity and limitations
- work-related calculations
- effects of weather and conditions on construction site or plant
- control systems
- pre-cast components
- pipes and fittings.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to perform maintenance and repair work on drainage assets by:

- planning and preparing work site
- performing maintenance and repair tasks according to manufacturer specifications and organisational requirements
- checking work, restoring work site, storing equipment and completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

## EVIDENCE GUIDE

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- site boundaries
- boundary protection
- extent of work
- utilities location
- safe work methods.
- damage to other utilities.

***Hazards*** may include:

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment*** used may include:

- personal protective equipment
- hand and power tools
- on- and off-road vehicles
- lifting and winching equipment
- mechanical excavation equipment
- compressors
- pneumatic spaders and attachments
- motorised cutting equipment
- chemical spraying apparatus
- small marine craft
- trenching systems
- portable pumps
- communication equipment
- breathing apparatus
- gas detection equipment
- rescue equipment.

***Assets*** may include:

- controlling equipment
- channels
- drains

## **RANGE STATEMENT**

- meter pits
- access chambers
- collection chambers
- drop structures
- erosion barriers
- anti-pollution devices
- grates
- head walls
- pipes
- outlets
- regulators
- pipes, including:
  - vitrified clay
  - polyvinyl chloride (PVC)
  - polyethylene
  - reinforced concrete
  - glass reinforced piping
  - ductile iron cement lined
  - cast iron cement lined
- fittings, including:
  - jointing systems for pipe types and prefabricated sections, e.g. gibault and tension bands
  - solvent cement joints
  - compression rings
  - bolted flanges
  - malleable jointing materials
  - electrofusion
  - butt welding
- prefabricated sections, including:
  - drainage sections
  - drainage pits
  - culverts
  - under road crossovers
  - person access pits
  - siphons
  - meter outlets.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP232B Operate water reticulation and distribution system

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to operate and adjust water reticulation and distribution system devices to meet organisational requirements.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with responsibility for ensuring the practical delivery, monitoring and regulation of reticulated water distribution services.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Establish system constraints and prepare work site.</b>	<p>1.1 Determine system layout and operational problem areas.</p> <p>1.2 Plan work required to operate and adjust <b><i>water reticulation system</i></b> according to <b><i>legislative and organisational requirements</i></b>.</p> <p>1.3 Select and check <b><i>equipment</i></b> and personal protective equipment to meet safety requirements of task and site.</p> <p>1.4 Identify and locate isolation valves and hydrants and follow standard organisational procedures for their operation.</p>
<b>2 Monitor performance and usage of distribution system devices.</b>	<p>2.1 Identify fluctuations in supply, system changes, community demands and water quality complaints.</p> <p>2.2 Collect and report data on system performance and usage according to organisational requirements.</p>
<b>3 Regulate flow.</b>	<p>3.1 Inspect <b><i>flow regulating systems</i></b> and adjust to meet demand requirements.</p> <p>3.2 Regulate and divert flows to facilitate repair or emergency activities.</p>
<b>4 Regulate pressure.</b>	<p>4.1 Monitor and adjust pressure to meet optimum delivery.</p> <p>4.2 Investigate <b><i>pressure fluctuations</i></b> and report according to legislative and organisational requirements.</p> <p>4.3 Document and report reticulation and distribution information according to organisational procedures.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- collect data
- produce reports and logs
- use safety equipment and personal protective equipment
- use tools and machinery
- follow plans, charts and instructions
- perform work-related calculations
- work effectively as part of a team
- apply procedures and standards
- communicate with employees and customers
- use communication equipment
- install and operate a stand pipe or fire plug
- record water losses
- give and receive instructions
- communicate effectively with utilities and service bodies
- identify system faults
- identify hazards
- use literacy skills in regard to verbal and written communication in the workplace
- implement remedial action to maintain supply.

#### **Required knowledge:**

- impact of the principles of hydraulics on the operation of flows
- system layout and performance
- standard operating procedures
- water hammer
- water quality and disinfection requirements
- environmental aspects of operation
- electrical safety for disconnecting and changing meters and fittings
- lock-out procedures for mechanical and electrical installations
- organisational communication systems
- hazardous materials handling
- landscape and ground structure of work area
- risk factors and potential hazards of operating water distribution systems
- conditions for connection to live water mains
- equipment operation, capacity and limitations
- effects of weather and conditions on systems, site or plant

## **REQUIRED SKILLS AND KNOWLEDGE**

- control systems.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to operate reticulation and distribution systems by:

- identifying conditions of system
- preparing work site
- monitoring system performance and usage
- monitoring and diverting flow
- monitoring and regulating pressure.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

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demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Water reticulation system***  
may include:

- scours
- chambers
- hydrants
- sluices
- valves
- main taps
- fire services
- service reservoirs.

***Legislative and organisational requirements***  
may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment*** may include:

- hand and power tools
- lifting equipment
- on- and off-road vehicles
- portable pumps
- communication equipment
- disinfection and sampling equipment
- gas detection equipment
- rescue equipment
- appropriate personal protective equipment.

***Flow regulating systems*** will include operation of:

- valving systems, such as:
  - sluice
  - gate
  - blade
  - non-return
  - electronic and manual controlling systems
  - service reservoirs.

***Pressure fluctuations*** may

- high
- low

## **RANGE STATEMENT**

be:

- outside acceptable limits.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## NWP233B Construct and install water distribution assets

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to construct and install water distribution assets.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with responsibility for ensuring that water distribution assets are constructed and installed in a safe and timely manner.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for construction and installation.</b>	<p>1.1 Determine <i>work requirements</i> for construction and installation of <i>water distribution system pipes and assets</i> from plans, specifications and instructions.</p> <p>1.2 Perform site checks according to legislative and organisational requirements to prevent damage to other utilities.</p> <p>1.3 Select and check <i>equipment and tools</i> to meet safety and work requirements of task and site.</p> <p>1.4 Select, fit and use personal protective equipment.</p>
<b>2 Construct and install distribution assets, pipes and associated fittings.</b>	<p>2.1 Excavate and prepare trenches according to specifications and <i>legislative and organisational requirements</i>.</p> <p>2.2 Lay bedding or foundation according to specifications.</p> <p>2.3 Inspect pipes and fittings, and lay or join according to manufacturer guidelines and organisational requirements.</p> <p>2.4 Install or place prefabricated components according to manufacturer guidelines and legislative and organisational requirements.</p> <p>2.5 Backfill excavations according to specifications.</p>
<b>3 Confirm work quality.</b>	<p>3.1 Check constructed and installed distribution assets, pipes and fittings to ensure that specifications are met.</p> <p>3.2 Check water quality testing results to ensure that organisational requirements are met.</p>
<b>4 Finalise work.</b>	<p>4.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>4.2 Restore work site to meet environmental and organisational requirements.</p> <p>4.3 Complete workplace records and as constructed drawings, and process as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- lay and join pipes
- install associated fittings and components
- identify and respond to operational problems
- interpret plans, instructions and standard operating procedures
- perform work-related calculations
- follow procedures and standards
- use safety and personal protective equipment
- use tools and machinery
- identify hazards
- give and receive instructions
- communicate with others
- use literacy skills in regard to verbal and written communication in the workplace
- work effectively as part of a team.

#### **Required knowledge:**

- OHS procedures
- personal work site safety procedures
- risk factors and potential hazards of construction and installation processes
- electrical safety for disconnection and changing meters and fittings
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- environmental aspects of construction and installation
- component parts
- shoring and levelling
- construction procedures
- conditions for connection to live water mains
- pipes and fittings
- disinfection 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to construct and install water distribution system assets by:

- planning work and preparing work site safely
- constructing and installing assets according to specifications and instructions
- checking quality of work and ensuring water quality standards
- clearing the work site
- completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## **EVIDENCE GUIDE**

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- location and extent of job
- risk assessment recommendations
- involvement of subcontractors
- equipment specifications
- materials specifications
- utilities location procedures
- environmental protection requirements
- boundary protection, signage and traffic management.

***Water distribution system pipes and assets*** may include:

- water mains
- services
- valves
- meters
- pipes, including:
  - polyvinyl chloride (PVC)
  - polyethylene
  - mild steel cement lined
  - ductile iron cement lined
  - cast iron
  - copper
  - glass reinforced piping
- fittings, including:
  - jointing systems for pipe types, e.g. gibault
  - tapping bands
  - tension bands
  - solvent joins
  - compression ring joints
  - bolted flanges
  - cathodic protection
- structures, including:
  - meter pits
  - person access pits
  - regulators
  - erosion barriers

## RANGE STATEMENT

- Equipment and tools* may include:
- head walls
  - thrust blocks.
  - personal protective equipment
  - hand and power tools
  - lifting and winching equipment
  - mechanical excavation equipment
  - pneumatic and motorised equipment, including:
    - compressors
    - pneumatic spades and attachments
    - motorised cutting equipment
    - communication equipment.
- Legislative and organisational requirements* may include:
- relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development agreements, such as land care agreements.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

## NWP234B Locate, identify and protect utility services

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to work near utility services during the construction, repair or installation of utilities' infrastructure. Work activities may involve trench excavation or the application of trenchless technologies for installation or repair.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for workers involved in the construction, repair or installation of underground utility infrastructure. Typically workers are involved in locating, identifying and protecting existing utilities' infrastructure to prevent damage, injury, death or loss of service.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare to locate utility services at work site.</b>	<p>1.1 Determine work site boundaries and requirements from plans, specifications and instructions.</p> <p>1.2 Obtain plans and relevant information from specific <i>utility service</i> owners using <i>appropriate information sources</i>.</p> <p>1.3 Determine <i>alignment of services</i> on site according to <i>utility locating procedures</i>.</p> <p>1.4 Determine <i>type, size and likely configuration</i> of all underground and overhead services from plans and typical or local installation practices.</p> <p>1.5 Identify hazards and precautions associated with excavating or working near utilities' apparatus.</p> <p>1.6 Review and apply safe work method statements associated with work activity and incorporate into job planning according to <i>legislative and organisational requirements</i>.</p>
<b>2 Locate utility apparatus by excavation.</b>	<p>2.1 Select and safely use <i>appropriate tools and equipment</i> for location of all apparatus.</p> <p>2.2 Identify <i>apparatus</i> and indicators of apparatus presence.</p> <p>2.3 Determine full extent of apparatus in the ground.</p>
<b>3 Operate plant in close proximity to underground or overhead utility apparatus.</b>	<p>3.1 Monitor plant during work activities and identify potential or actual encroaches of plant on minimum clearances to apparatus.</p> <p>3.2 Give instructions to plant operator using agreed signals.</p>
<b>4 Protect and support utility apparatus during excavation and backfilling.</b>	<p>4.1 Protect apparatus according to utility owner requirements to prevent damage.</p> <p>4.2 Support apparatus along or across excavation according to utility owner requirements or engineering advice to prevent damage.</p> <p>4.3 Report damage to apparatus to utility owner according to agreed protocols.</p> <p>4.4 Reinstate apparatus during backfill according to utility owner's requirements.</p>
<b>5 Initiate emergency procedures.</b>	<p>5.1 Recognise emergency situations or events.</p> <p>5.2 Implement emergency response according to procedures for particular infrastructure involved.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- locate and identify utilities
- assess and identify risk of potential hazards associated with each utility
- respond to all types of emergencies relating to utility services
- use basic mathematics for calculations and measurement
- use safety equipment and personal protective equipment
- use tools and equipment
- follow policies, procedures and standards
- communicate with employees, other service providers and customers
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- use communication systems.

#### **Required knowledge:**

- published guidelines for working near utility services in the State or Territory in which work is being undertaken
- system layout
- environmental aspects of excavation
- relevant utilities and service bodies
- communication systems
- landscape and ground structure of work area
- risk assessment and identification of potential hazards associated with each utility
- emergency response procedures for all types of utility services
- equipment operation, capacity and limitations
- effects of weather and conditions on site or plant.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to work near utility services during the construction, repair or installation of utilities' infrastructure including:

- gathering information regarding location of utilities at a particular site
- gathering and applying safe work methods for locating and protecting utilities at or near a work site
- selecting appropriate tools and equipment
- monitoring use of equipment and using agreed procedures and signals to ensure timely warnings of proximity to utilities' apparatus
- protecting and supporting apparatus during performance of work tasks and during site restoration
- applying emergency procedures in response to a range of specific incidents.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's

## EVIDENCE GUIDE

- competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
  - where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
  - assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Utility service*** may include:
- electricity
  - gas
  - fuel and oil
  - water
  - sewer and stormwater
  - communication lines
  - pay television
  - road traffic control
  - power cables
  - steam pipes
  - relevant surface fittings
  - cathodic protection cables.
- Appropriate information sources*** may include:
- 'Dial Before You Dig' national call centre for subscribing utilities (note: not all underground utility services are listed with 'Dial Before You Dig')
  - local agencies, which should also be contacted following 'Dial Before You Dig' enquiries.
- Alignment of services*** refers to:
- location of utilities' assets at a certain or agreed distance from property boundaries in the road reserve.
- Utility locating procedures*** may include locating utility apparatus using:
- utility plans
  - surface fittings
  - indicators or markers
  - standard allocations
  - on-site features
  - manual location.
- Type, size and likely configuration*** of utility apparatus may include:
- colour
  - materials
  - appearance
  - dimensions
  - installation practices
  - arrangement of apparatus.
- Legislative and organisational requirements***
- relevant federal and state or territory legislation and regulations

## **RANGE STATEMENT**

may include:

- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

*Appropriate tools and equipment* may include:

- personal protective equipment
- shovels with insulated handles
- crow bars with insulated handles
- air or water vacuum potholing equipment
- hand and power tools
- lifting and winching equipment
- mechanical excavation equipment
- pneumatic and motorised equipment, including:
  - compressors
  - pneumatic spades and attachments
  - motorised cutting equipment
  - on- and off-road vehicles
  - portable pumps
  - communication equipment.

*Apparatus* may include:

- pipes, including:
  - vitrified clay
  - reinforced concrete
  - polyvinyl chloride (PVC)
  - polyethylene
  - cast iron cement lined
  - ductile iron cement lined
  - glass reinforced piping
  - mild steel cement lined
- structures, including:
  - meter pits
  - valve pits
  - drop structures
  - regulators
  - erosion barriers
  - person access chambers and pits
  - head walls
  - thrust blocks
  - inspection shafts.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Common

## **NWP239B Identify and apply water entitlements and delivery processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to identify and apply irrigation, and stock and domestic supply systems, measure water and report water usage.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff involved with the operation of raw water systems, including the identification of water entitlements and delivery processes and the use of legislation relevant to field operators.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Identify and apply water entitlements.</b>	<p>1.1 Apply principles of allocation or sale of water to properties and landholders.</p> <p>1.2 Apply changes to <b><i>entitlement or allocation</i></b> to properties and between properties to workplace practices where relevant.</p> <p>1.3 Apply relevant sections of <b><i>legislation</i></b> relating to water distribution and delivery to workplace practices, including breach notification.</p> <p>1.4 Identify relevant water products and services offered to customers, and customer contracts.</p>
<b>2 Identify and apply principles of water supply networks and distribution systems.</b>	<p>2.1 Identify relevant <b><i>type and structure</i></b> of water supply networks and their interaction where relevant.</p> <p>2.2 Identify design and operation of relevant <b><i>components of water distribution system</i></b>.</p> <p>2.3 Identify and monitor principles of water flow and factors affecting water flow.</p> <p>2.4 Identify and apply basic principles of regulating water efficiently through the water supply system.</p>
<b>3 Record and monitor water use.</b>	<p>3.1 <b><i>Monitor, report and measure water flows and volumes</i></b> according to legislative and organisational requirements.</p> <p>3.2 Identify and monitor balance of water entitlements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- follow relevant written policies and procedures
- read meters and other measurement instruments
- perform work-related calculations
- work effectively as part of a team
- complete estimates and record water use
- operate a range of flow control devices
- use literacy skills in regard to verbal and written communication in the workplace
- use personal protective equipment.

#### **Required knowledge:**

- relevant sections of Water Acts and legislation
- organisational operating procedures
- property water allocation or entitlement policies
- transferable water entitlement procedures
- workplace system networks or distribution systems
- depth and flow conversion charts.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to identify and apply irrigation, and stock and domestic supply systems, measure water and report water usage including:

- applying water allocation and entitlement principles and procedures
- interpreting and applying relevant legislation, including identification and notification of breaches
- calculating water flows and volumes
- regulating water delivery according to legislative and organisational requirements.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Entitlement or allocation*** may include:

- property water rights or leases
- permanent or temporary transfers
- allocations based on storage levels.

***Legislation*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Type and structure*** of water reticulation system may include:

- manual and automated channel systems
- pipeline systems
- rivers and streams
- combination of these.

***Components of water distribution system*** may include:

- storages
- channels
- pipelines
- tanks
- control and regulating structures
- supply points.

Operation of reticulation system is ***monitored and reported*** and may require:

- interaction and communication with other employees, other authorities and general public
- visual observation
- use of computerised monitoring systems
- application of processes for identifying and reporting regulated water use and suspected breaches
- implementation of reporting procedures that may also include procedures for implementation of by-laws, organisational policies and statutory requirements.

***Measurement of water flows and volumes*** may be:

- metered
- estimated
- calculated on past usage rates.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP240B Inspect and report catchment and surrounding areas

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to inspect and report on surface catchment areas and associated rivers, lakes, water bodies, dams, water storages and groundwater areas to identify potential risks to water quality, the environment and the public. The unit also requires the ability to apply organisational procedures, identify and record unusual activities or events, apply relevant control measures and report outcomes.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with specific responsibility for inspecting catchments and surrounding areas and contributing to catchment management and control.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Inspect and monitor catchment and surrounding areas.</b>	<p>1.1 Identify and apply work requirements for undertaking <i>inspections of catchments and surrounding areas</i>.</p> <p>1.2 Inspect and monitor designated locations according to agreed schedule and procedures.</p> <p>1.3 Provide reports identifying maintenance tasks required to ensure that facilities meet required standards to relevant personnel using standard organisational procedures.</p>
<b>2 Report catchment conditions.</b>	<p>2.1 Measure and record catchment inflows and outflows or extractions.</p> <p>2.2 Identify organisation standards for the condition and maintenance of catchment environment.</p> <p>2.3 Identify and report <i>changes to environmental conditions</i>.</p>
<b>3 Assist in investigating hazards, risks and catchment security.</b>	<p>3.1 Identify and report activities within catchment that pose a hazard or risk to the public, water quality or the environment according to organisational guidelines.</p> <p>3.2 Identify and report activities of external parties within the catchment and surrounding area that breach organisational guidelines.</p> <p>3.3 Check and confirm public complaints and report to relevant personnel.</p>



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- undertake inspections of catchment and surrounds
- identify and respond to operational problems
- use communication systems
- provide basic verbal or written reports
- follow plans and instructions
- follow procedures and standards
- use safety equipment and personal protective equipment
- communicate with customers and other employees
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- follow organisational reporting procedures.

#### **Required knowledge:**

- environmental, landscape and ground structure of work area
- risk factors and potential hazards of surface water systems
- catchment emergency response procedures
- catchment security procedures
- operation of communication systems
- customer service
- effects of weather and conditions on operation of catchment area
- relevant utilities and service bodies
- equipment operation
- Water Act and statutory legislation governing typical or routine catchment activities.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to inspect and report on surface catchment areas and associated rivers, lakes, water bodies, dams, water storages and groundwater areas to identify potential risks to water quality, the environment and the public including:

- interpreting work requirements and inspecting specific catchment locations
- monitoring and reporting environmental conditions
- investigating breaches and complaints
- compiling reports
- contributing to catchment security procedures.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Inspections of catchments and surrounding areas*** may require:

- interaction and communication with other employees, other authorities and general public
- visual observation
- implementation of reporting procedures that may also include procedures for implementation of by-laws, organisational policies and statutory requirements
- bushcraft
- eradication of feral animals and noxious plants
- identification of declared flora
- fire suppression procedures
- knowledge of system layout
- use of gauging stations, telemarkers or supervisory control and data acquisition (SCADA) systems.

***Changes to environmental conditions*** may include:

- weed infestations
- erosion or bank stability
- blue green algae outbreaks
- dead stock
- storm debris affecting waterways.

### Unit Sector(s)

Not applicable.

### Competency field

**Competency field**      Collection and distribution

# NWP241B Inspect and maintain basic dams and water storages

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to undertake basic inspection of dams and water storages and to conduct routine maintenance according to organisational maintenance plans and manufacturer specifications.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with specific responsibility for undertaking basic surveillance and conducting routine maintenance on dams and storages, including urban reservoirs and large wastewater lagoons.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Undertake basic dam or storage inspection.</b>	<p>1.1 Select, fit and use safety equipment, including personal protective equipment.</p> <p>1.2 Carry out <b><i>routine inspections</i></b> of dams and <b><i>storages</i></b> according to organisational procedures.</p> <p>1.3 Read and record monitoring devices and flow recording and measurement systems.</p> <p>1.4 Identify assets and structural components requiring routine maintenance or repairs.</p>
<b>2 Undertake routine maintenance of dam or storage equipment and structures.</b>	<p>2.1 Select and check equipment and materials required for maintenance and repair tasks.</p> <p>2.2 Carry out <b><i>routine maintenance</i></b> according to organisational requirements.</p> <p>2.3 Operate <b><i>basic flow control, measuring, surveillance and ancillary devices</i></b> as part of routine checks.</p>
<b>3 Report basic dam or storage inspection and routine maintenance.</b>	<p>3.1 Communicate abnormal observations and potentially serious maintenance issues with line management.</p> <p>3.2 Complete dam inspection reports and routine maintenance reports and forward to relevant personnel.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- undertake visual inspections
- undertake routine maintenance of plant, equipment and structures
- exercise valves
- perform work-related calculations
- measure and record seepage flow
- operate controls and ancillary equipment according to standard operating procedures
- operate communications equipment
- produce reports or logs
- follow policies, procedures and standards
- use safety and personal protective equipment
- adjust mechanical and electrical systems
- identify control system faults
- communicate with other employees
- use literacy skills in regard to verbal and written communication in the workplace
- work effectively as part of a team.

#### **Required knowledge:**

- visual and electronic inspection procedures
- equipment operation, capacity and limitations
- system layout
- risk factors and potential hazards of surface water systems
- routine maintenance procedures
- communication and reporting systems.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to undertake basic inspection of dams and water storages and to conduct routine maintenance including:

- conducting routine inspections of dams and storages according to organisational requirements
- taking readings from specified devices
- identifying and reporting repair and maintenance requirements
- conducting routine basic maintenance according to organisational maintenance plans
- completing inspection and maintenance reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence



## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Routine inspections*** may include:

- visual observation of changes to assets, including:
- cracking
- movement
- debris
- concrete erosion
- flaking of paint or coatings
- corrosion of materials
- electronic inspection.

**Storages** may include:

- urban water storages
- urban reservoirs
- large wastewater lagoons.

***Routine maintenance*** may include:

- greasing or oiling plant and equipment
- exercising valves
- checking pressures and position indicators.

***Basic flow control, measuring, surveillance and ancillary devices*** may include:

- auxiliary power plants and auxiliary drives
- electronic catchment surveillance
- monitoring and measuring systems
- recording systems
- small marine craft
- manual and electrical hydraulic systems
- flow control and adjustment equipment
- pumping systems, including:
- submersible
- centrifugal
- valving systems, including:
- sluice
- blade
- gate
- non-return
- pressure reducing
- manually and electronically operated floodgates
- spillways.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Dam safety

## **NWP242B Monitor and report water extraction**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor the extraction of water from waterways and water bodies and to report risks, compliance and complaints.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with responsibility for ensuring that water extraction complies with water use legislation.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor designated areas.</b>	<p>1.1 Use water allocation management plan to check allowances in <b><i>designated areas</i></b>.</p> <p>1.2 Select, check and prepare <b><i>equipment</i></b> to monitor water extraction.</p> <p>1.3 <b><i>Monitor</i></b> designated areas according to agreed schedule and organisational procedures.</p>
<b>2 Measure and monitor flow rates and usage.</b>	<p>2.1 Monitor flow meters and record data according to <b><i>organisational and legislative requirements</i></b>.</p> <p>2.2 Monitor water extraction for compliance with licensing and record data according to organisational requirements.</p> <p>2.3 Monitor and record water levels.</p>
<b>3 Identify and report risks, breaches and complaints.</b>	<p>3.1 Identify and report <b><i>risks</i></b> to public, users and environment according to organisational procedures.</p> <p>3.2 Identify and report <b><i>breaches</i></b> of relevant legislation.</p> <p>3.3 Investigate and report complaints from the public and users regarding water allocation and quality.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- use safety and personal protective equipment
- work effectively as part of a team
- operate communications equipment
- isolate waterways
- follow plans, charts and instructions
- follow policies, procedures and standards
- calculate inflow and outflow rates
- give and receive instructions
- use literacy skills in regard to verbal and written communication in the workplace
- communicate with customers and other employees.

#### **Required knowledge:**

- effects of weather and conditions on operation of site or plant
- system layout
- relevant utilities and service bodies
- materials handling
- environmental, landscape and ground structure of river system and flood plains
- communication systems
- water flow measurement and calculations
- control systems
- equipment operation, capacity and limitations
- risk factors and potential hazards of surface water systems.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor the extraction of water from waterways and water bodies and to report risks, compliance and complaints including:

- monitoring water extraction with reference to water usage legislation using relevant equipment
- reading meters, recording data and performing calculations
- identifying and reporting risks and breaches, and investigate complaints.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Designated areas*** may include:

- urban locations, including:
- rivers
- weirs
- dams
- rural locations, including:
- rivers
- weirs
- bores
- springs.

***Equipment*** may include:

- electronic digital monitoring and metering systems
- recording systems
- communication equipment, including:
- two-way radio
- telephone
- fax
- small marine craft
- basic hand and power tools
- lifting and winching equipment
- computerised equipment
- on- and off-road vehicles.

***Monitoring*** may require:

- interaction and communication with other employees, other authorities and general public
- visual observation
- implementation of reporting procedures that may also include procedures for implementation of by-laws, organisational policies and statutory requirements.

***Organisational and legislative requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

## **RANGE STATEMENT**

*Risks* may include:

- contamination
- bacterial growth
- algal blooms.

*Breaches* may include:

- excessive use
- siphoning
- illegal connection
- uncontrolled run-off.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP243B Operate bore fields and groundwater source systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to operate bore fields and groundwater source systems. Monitoring the availability and quality of supply, and control of water flows from the source are also required, in conjunction with the ability to apply legislative and organisational requirements.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff operating bores and groundwater sources in urban or rural areas.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor water quality and supply of bore field or groundwater source.</b>	<p>1.1 Determine work requirements or specifications, including required <b><i>equipment</i></b>.</p> <p>1.2 <b><i>Monitor designated locations</i></b> within groundwater sources area according to agreed schedule and <b><i>legislative and organisational requirements</i></b>.</p> <p>1.3 Monitor water depths according to agreed schedule and procedures.</p> <p>1.4 Collect and record water samples according to organisational requirements.</p> <p>1.5 Take water flow measurements to determine demand and usage rates.</p>
<b>2 Check source areas.</b>	<p>2.1 Identify potential hazards to public and environment and report them to relevant personnel.</p> <p>2.2 Identify and report breaches of legislative and organisational requirements.</p> <p>2.3 Respond to public enquiries in line with organisational requirements.</p>
<b>3 Regulate and report flows.</b>	<p>3.1 Regulate flow control mechanisms according to organisational requirements to maintain system supply.</p> <p>3.2 Produce data relating to system demand adjustments according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- operate communications equipment
- use tools and equipment
- interpret plans, instructions and standard operating procedures
- perform work-related calculations
- follow procedures and standards
- use safety equipment and personal protective equipment
- identify hazards
- give and receive instructions
- communicate with customers and other employees
- operate effectively as part of a team
- measure water flows and water table levels
- select and collect samples
- identify control system faults
- identify and prevent well contamination
- adjust mechanical and electrical systems
- use literacy skills in regard to verbal and written communication in the workplace
- isolate mains and waterways.

#### **Required knowledge:**

- OHS standards and requirements
- public and site safety
- system hydraulics and flushing
- system layout
- lock-out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- environmental, landscape and ground structure of work area
- risk factors and potential hazards of groundwater source systems
- well contaminants
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- sampling procedures
- water flow measurement
- control systems
- basic types of bore construction and principles.



## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to operate bore fields and groundwater source systems including:

- monitoring groundwater depth
- taking and processing water samples ready for testing
- taking and recording flow measurements
- monitoring groundwater sources and surrounding area
- reporting environmental problems and breaches
- operating flow control and regulation devices
- recording and reporting work activities.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Equipment*** used may include:

- electronic digital monitoring and metering systems
- recording systems
- communication equipment, including:
  - two-way radio
  - telephone
  - fax
- basic hand and power tools
- on- and off-road vehicles
- flow control and adjustment equipment
- pumping systems, including:
  - submersible
  - centrifugal
  - multiple stage
  - deep well pumps
- valving systems, including:
  - sluice
  - blade
  - gate
  - non-return
  - pressure reducing
- water table level measuring devices
- personal protective equipment.

***Monitoring designated locations*** may require:

- interaction and communication with other employees, other authorities and general public
- visual observation
- directing traffic and the public
- implementation of reporting procedures that may also include procedures for implementation of by-laws, organisational policies and statutory requirements.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and

## **RANGE STATEMENT**

- induction programs
- relevant community planning and development agreements, such as land care agreements.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## NWP244B Maintain and repair bulkwater assets

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to maintain and repair bulkwater assets, including planning and preparing for work, conducting maintenance and repair work and cleaning, flushing and disinfecting as appropriate.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with responsibility for ensuring that maintenance and repair work on bulkwater assets is completed in a safe and timely manner.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for maintenance.</b>	<p>1.1 Determine work requirements for the maintenance and repair of <b><i>assets</i></b> from work drawings, plans, specifications and instructions.</p> <p>1.2 Select and check <b><i>equipment and tools</i></b> required to meet safety requirements of task and site.</p> <p>1.3 Select, fit and use personal protective equipment.</p>
<b>2 Maintain and repair assets, pipes and fittings.</b>	<p>2.1 Repair or replace leakages and damaged assets according to organisational procedures.</p> <p>2.2 Check and clean pipes and <b><i>fittings</i></b> before use.</p> <p>2.3 Select fittings and tools and lay and/or join assets according to manufacturer guidelines and <b><i>legislative and organisational requirements</i></b>.</p> <p>2.4 Conduct preventative maintenance according to organisational maintenance programs.</p> <p>2.5 Perform cleaning, flushing and disinfection according to organisational requirements.</p> <p>2.6 Check work to ensure that specifications have been met.</p>
<b>3 Finalise work.</b>	<p>3.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>3.2 Restore work site to meet environmental and organisational requirements.</p> <p>3.3 Complete workplace records and process them as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- maintain appropriate assets
- dewater and clean system and structures
- maintain surface protection
- record work activities
- identify and respond to operational problems
- use communication systems
- follow plans and instructions
- follow policies and procedures
- use safety equipment and personal protective equipment
- use tools and machinery
- perform calculations
- work effectively as part of a team
- identify hazards
- give and receive instructions
- use literacy skills in regard to verbal and written communication in the workplace
- communicate with customers and other employees.

#### **Required knowledge:**

- risk factors and potential hazards involved in maintenance of bulkwater asset processes
- component parts
- standard operating procedures for maintenance activities
- system hydraulics basics
- system layout
- environmental aspects of operation and maintenance
- lock-out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- landscape and ground structure of work area
- control systems
- OHS procedures
- personal work site safety
- disinfection procedures in line with legislative and organisational requirements.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to conduct maintenance and repair work on bulkwater assets by:

- planning and preparing the work site
- performing maintenance and repair tasks according to manufacturer specifications and organisational requirements
- conducting cleaning, flushing and disinfection as required
- checking work, restoring work site, storing equipment and completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Assets*** may include:
- bulkwater pipes, including:
    - reinforced concrete
    - polyvinyl chloride (PVC)
    - polyethylene
    - cast iron cement lined
    - ductile iron cement lined
    - glass reinforced piping
    - mild steel cement lined
    - structures, including:
      - meter pits
      - valve pits
      - regulators
      - person access chambers and pits
      - head walls
      - thrust blocks
      - large mains
      - flow recorder.
- Equipment and tools*** may include:
- hand and power tools
  - lifting and winching equipment
  - mechanical excavation equipment
  - pneumatic and motorised equipment, including:
    - compressors
    - pneumatic spades and attachments
    - motorised cutting equipment
    - on- and off-road vehicles
    - portable pumps
    - communication equipment
    - breathing apparatus
    - gas detection equipment
    - rescue equipment
    - appropriate personal protective equipment.
- Fittings*** may include:
- jointing systems for pipe types, e.g. gibault
  - tension bands
  - compression ring joints



## RANGE STATEMENT

*Legislative and organisational requirements* may include:

- bolted flanges
- dismantling joints
- cathodic protection
- electrofusion
- welded joints.
- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

## NWP245B Maintain tanks and water storage assets

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to maintain and repair tanks and water storage assets, including reservoirs, balancing storages, sand dams and ring dams.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with specific responsibility for ensuring that maintenance and repair of tanks and water storage assets are completed in a safe and timely manner.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for work.	1.1 Determine <i>work requirements</i> for maintenance and repair of <i>tanks and water storage assets</i> from specifications and instructions. 1.2 Plan work according to job requirements using relevant plans, drawings, standards and technical data. 1.3 Check coordination issues with relevant personnel, including isolations and permits to work. 1.4 Identify, check and prepare materials, <i>equipment</i> and resources required to satisfy job plan according to <i>legislative and organisational requirements</i> . 1.5 Select, fit and use personal protective equipment.
2 Clean and maintain water tanks and water storage assets.	2.1 Monitor, operate and tag flow-regulating devices to isolate tanks according to organisational requirements. 2.2 Use safety equipment and follow safety procedures for entry into storages. 2.3 Carry out de-silting processes and clean and flush assets according to organisational requirements. 2.4 Repair minor structural damage to storage assets and tanks and identify and report major faults according to organisational procedures. 2.5 Check and operate flow-regulating devices to return tank to service. 2.6 Check maintenance and repairs to tanks and water storage assets to ensure specifications are met. 2.7 Check level sensing equipment and alarms to ensure effective operation.
3 Review, report and record work.	3.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures. 3.2 Restore work site to meet environmental and organisational requirements. 3.3 Maintain workplace records as required.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- maintain structures, fittings and assets
- conduct earthworks
- identify and respond to operational problems
- produce reports and logs
- use safety and personal protective equipment
- use tools and equipment
- follow plans and instructions
- perform work-related calculations
- apply procedures and standards
- communicate with employees and customers
- work effectively as part of a team
- use communication systems
- give and receive instructions
- identify system faults
- use literacy skills in regard to verbal and written communication in the workplace
- identify hazards.

#### **Required knowledge:**

- system hydraulics basics
- system layout
- environmental aspects of maintenance
- lock-out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- material safety data sheets (MSDS)
- landscape and ground structure of work area
- risk factors and potential hazards of maintenance processes
- equipment operation, capacity and limitations
- control systems
- pipes and fittings
- disinfection of systems and chemical usage.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to perform maintenance and repair work on tanks and water storage assets by:

- planning and preparing work site
- performing maintenance and repair tasks according to manufacturer specifications and organisational requirements
- checking work, restoring work site, storing equipment and completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice
- the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

## **EVIDENCE GUIDE**

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- work site boundaries
- types of tanks and assets to be maintained or repaired
- methods to be used
- risk assessment and preventative measures.

***Tanks and water storage assets*** may include:

- pipes
- valves
- controlling equipment of polyvinyl chloride (PVC)
- polyethylene
- mild steel cement lined
- ductile iron cement lined
- cast iron cement lined
- asbestos cement
- copper
- glass reinforced piping
- structures, including:
  - meter pits
  - person access chambers or pits
  - valve chambers
  - regulators
  - erosion barriers
  - head walls
  - thrust blocks
  - fittings, including:
    - hydrants
    - sluices
    - scours
    - main taps
  - jointing systems for pipe types, e.g. gibault
  - tapping bands
  - tension bands
  - solvent cement joints
  - compression ring joints
  - bolted flanges
  - electrofusion



## RANGE STATEMENT

*Equipment* used may include:

- welded
- cathodic protection.
- hand and power tools
- lifting and winching equipment
- mechanical excavation equipment
- pneumatic and motorised equipment, including:
  - compressors
  - pneumatic spades and attachments
  - motorised cutting equipment
  - on- and off-road vehicles
  - portable pumps
  - communication equipment
  - breathing apparatus
  - gas detection equipment
  - rescue equipment
  - appropriate personal protective equipment.
- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

*Legislative and organisational requirements* may include:

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

## **NWP246B Inspect and maintain public facilities**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to inspect and perform or arrange, the cleaning and maintenance of public facilities, including the disposal of wastes at the facilities of water organisations.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with specific responsibility for conducting general inspections and performing or arranging maintenance of a water organisation's public facilities at a designated site.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Inspect, plan and prepare work areas.</b>	<p>1.1 Determine work site locations and boundaries and work requirements from instructions, inspection records, guidelines and specifications.</p> <p>1.2 <b><i>Inspect areas and facilities</i></b> and identify, control and report potential hazards following OHS and organisational guidelines.</p> <p>1.3 Select and check <b><i>equipment</i></b> to meet maintenance requirements of task and site.</p>
<b>2 Perform or arrange maintenance of public facilities.</b>	<p>2.1 Perform or arrange cleaning or maintenance of areas and facilities to meet <b><i>legislative and organisational requirements</i></b>.</p> <p>2.2 Order supplies as required.</p> <p>2.3 Store, handle and use chemicals and equipment appropriately and according to legislative and organisational requirements.</p> <p>2.4 Dispose of <b><i>wastes</i></b>, including dangerous materials, according to legislative and organisational requirements.</p>
<b>3 Record and report on work.</b>	<p>3.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>3.2 Restore work site to meet environmental and organisational requirements.</p> <p>3.3 Maintain workplace <b><i>records</i></b> as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- inspect and maintain public facilities
- use safety equipment and personal protective equipment
- store, transport, handle and use chemicals safely
- perform work-related calculations
- apply procedures and standards for maintenance of public facilities
- communicate with employees, customers and the public
- work effectively as part of a team
- give and receive instructions
- use literacy skills in regard to verbal and written communication in the workplace
- use hand tools and equipment.

#### **Required knowledge:**

- environmental aspects of inspecting and maintaining public facilities
- use, storage, handling and transport of hazardous substances
- landscape and ground structure of work area
- risk factors and potential hazards of maintaining public facilities
- relevant material safety data sheets (MSDS)
- effects of weather and conditions on the use of disinfecting and cleaning products.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to inspect and perform or arrange, the cleaning and maintenance of public facilities including:

- interpreting work instructions and inspect sites
- select appropriate equipment to maintain public facilities
- cleaning or arranging cleaning of public facilities
- maintaining or arranging the maintenance of public facilities
- replenishing supplies
- clearing and disposing of waste and debris safely
- restoring work site and store equipment
- completing relevant documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

## EVIDENCE GUIDE

experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Inspection*** may require:
- interaction and communication with other employees, other authorities and general public
  - visual observation
  - record keeping
  - implementation of reporting procedures that may also include procedures for implementation of by-laws, organisational policies and statutory requirements.
- Areas and facilities*** to be monitored and maintained:
- will be dependent upon water organisation's infrastructure but may include areas such as dams, reservoirs and reserves
  - may include a range of facilities, such as:
    - toilet facilities, including septic systems
    - barbeques and surrounds
    - public recreation areas, including seating and picnic areas
    - boat ramps
    - jetties
    - observation decks
    - walkways.
- Equipment*** used may include:
- hand and power tools
  - motorised machinery
  - on- and off-road vehicles
  - small marine craft
  - chemicals and mixers
  - chemical spraying apparatus
  - mixing equipment and storage areas
  - appropriate personal protective equipment
  - communication equipment.
- Legislative and organisational requirements*** may include:
- relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development agreements, such as land care agreements.

## RANGE STATEMENT

**Wastes** may include:

- hazardous waste, such as:
- broken glass
- syringes
- biological hazards, such as:
- wastewater
- excrement
- dead animals
- noxious weeds
- non-hazardous substances, such as:
- paper
- general household rubbish
- garden waste, such as:
- lawn clippings
- weeds
- branches
- soil.

**Records** and reporting may include:

- records, such as:
- manual or electronic data
- copies of contractor permits to work, site inductions and OHS procedures
- work orders
- purchase orders
- reporting, such as:
- verbal reports
- paper-based reports
- electronic reports.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Common



## NWP247A Maintain catchment and surrounding areas

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to maintain surface catchment areas and associated rivers, lakes, water bodies, dams, water storages and groundwater areas in a manner that meets organisational standards and contributes to the maintenance of water quality, and the protection of the environment and the public. The ability to apply organisational procedures, apply procedures to maintain environmental conditions, undertake maintenance and report outcomes is essential to performance.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with specific responsibility for maintaining catchment and surrounding areas and contributing to catchment management and control.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for work.	1.1 Access and review catchment inspection records describing maintenance requirements for action. 1.2 Identify and apply work requirements and timelines for <i>performing maintenance tasks</i> of catchments and surrounding areas. 1.3 Assess site, <i>equipment</i> and methods to be used for hazards or risks and apply appropriate control measures using safe work procedures. 1.4 Plan maintenance work to be conducted within required timeframe, using allocated resources effectively and according to legislative and organisational requirements.
2 Maintain environmental condition of waterways and surrounding areas.	2.1 Remove dead livestock or native fauna from waterways and surrounding catchments and dispose of according to organisational requirements. 2.2 Remove flood debris from waterways and surrounding areas according to organisational procedures. 2.3 Carry out fuel reduction burns according to organisational procedures. 2.4 Apply <i>basic control measures</i> to contain or control chemical spills or contaminated water supplies. 2.5 Identify and report potential or emerging changes to environmental conditions according to organisational requirements.
3 Eradicate noxious weeds and feral pests.	3.1 Identify noxious weeds and feral pests that are contributing to degradation of catchment and surrounding areas. 3.2 Use standard organisational procedures for managing and removing noxious weeds and feral pests according to safe work practices. 3.3 Compile reports on eradication process according to organisational procedures.
4 Perform minor maintenance.	4.1 Identify <i>infrastructure</i> requiring minor maintenance. 4.2 Apply erosion control measures for waterways and surrounding areas. 4.3 Make repairs using appropriate equipment and resources to a standard that meets organisational requirements. 4.4 Provide reports of maintenance performed according to organisational procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- undertake inspections of catchment and surrounds
- identify and respond to maintenance problems
- use communication systems
- provide basic verbal or written reports
- follow plans and instructions
- perform work-related calculations
- follow organisational procedures and standards
- use safety equipment and personal protective equipment
- communicate with customers and other employees
- use literacy skills in regard to verbal and written communication in the workplace
- work effectively as part of a team.

#### **Required knowledge:**

- environmental, landscape and ground structure of work area
- risk factors and potential hazards of surface water systems
- catchment emergency response procedures
- catchment security procedures
- operation of communication systems
- customer service
- effects of weather and conditions on operation of site or plant
- relevant utilities and service bodies
- equipment operation.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to maintain surface catchment areas including:

- interpreting work requirements
- monitoring and reporting environmental conditions
- maintaining catchment areas and removing debris and noxious weeds and pests according to legislative and organisational requirements
- performing minor maintenance tasks
- compiling reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Performing maintenance tasks*** may require:

- interaction and communication with other employees, other authorities and general public
- visual observation
- implementation of reporting procedures that may also include procedures for implementation of by-laws, organisational policies and statutory requirements
- bushcraft
- eradication of feral pests and noxious plants
- identification of declared flora
- fire suppression or fuel reduction procedures
- system layout.

***Equipment*** used may include:

- personal protective equipment
- electronic digital monitoring systems
- recording systems
- on- and off-road vehicle operation
- basic hand and power tools
- communication equipment, including:
  - two-way radio
  - telephone
  - fax
  - small marine craft.

***Basic control measures*** may include:

- minor earthworks, such as bunding and diversions
- booms and other temporary bunding systems
- aeration
- eductor trucks
- hay bales
- geofabric and beaching.

***Infrastructure*** that may require minor maintenance includes:

- fences and gates
- buildings, plant and equipment
- signage
- roads, tracks and paths
- public facilities including:
  - bridges
  - boardwalks

## **RANGE STATEMENT**

- display boards
- campgrounds
- picnic areas
- toilets
- fireplaces.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution



## **NWP250B Construct and install wastewater pipelines**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to construct and install wastewater collection assets.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with specific responsibility for ensuring that wastewater pipelines are constructed and installed in a safe and timely manner.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare construction and installation of collection pipelines.</b>	<p>1.1 Determine <b><i>work requirements</i></b> for construction and installation from plans, specifications and instructions.</p> <p>1.2 Perform site check to prevent damage to other utilities according to legislative and organisational requirements.</p> <p>1.3 Select and check <b><i>equipment and tools</i></b> required to meet safety requirements of task and site.</p> <p>1.4 Identify potential risks to public and environment, and take appropriate steps to minimise and eliminate risks.</p>
<b>2 Construct and install collection pipelines.</b>	<p>2.1 Select, fit and use personal protective equipment.</p> <p>2.2 Excavate and prepare trenches according to specifications and <b><i>legislative and organisational requirements</i></b>.</p> <p>2.3 Lay bedding or foundation according to specifications.</p> <p>2.4 Select and lay or join <b><i>pipes</i></b> and <b><i>fittings</i></b> to grade according to manufacturer guidelines and organisational requirements.</p> <p>2.5 Backfill excavations according to specifications.</p>
<b>3 Review construction and installation of collection assets.</b>	<p>3.1 Check constructed or installed collection pipes and fittings to ensure specifications are met.</p> <p>3.2 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>3.3 Restore work site to meet environmental and organisational requirements.</p> <p>3.4 Complete workplace records and as constructed drawings and process as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- install components specified for wastewater collection system, including requirements for protection
- construct appropriate assets
- install junctions and side lines
- identify and respond to operational problems
- use communication systems
- follow plans, instructions, standards and standard operating procedures
- perform work-related calculations
- use safety equipment and personal protective equipment
- use tools and machinery
- identify hazards
- give and receive instructions
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- communicate with customers and other employees.

#### **Required knowledge:**

- OHS procedures
- personal work site safety
- risk factors and potential hazards of construction and installation processes
- equipment operation, capacity and limitations
- safe use of lasers
- use of automatic levels
- basic levelling techniques
- profiles and boning rods
- pipe laying techniques
- effects of weather and conditions on operation of site or plant
- environmental aspects of construction and installation
- component parts
- shoring and levelling
- construction and installation procedures and materials.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to construct and install wastewater collection system pipelines by:

- planning work and preparing work site safely
- constructing and installing pipes according to specifications and instructions
- checking quality of work
- clearing work site
- completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

## EVIDENCE GUIDE

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- location and extent of job
- risk assessment recommendations
- involvement of subcontractors
- equipment specifications
- material specifications
- utilities' location procedures
- environmental protection requirements
- boundary protection
- signage and traffic management.

***Equipment and tools*** may include:

- hand and power tools
- lifting and winching equipment
- mechanical excavation equipment
- levering equipment
- pneumatic and motorised equipment, including:
- compressors
- pneumatic spades and attachments
- motorised cutting equipment
- pipes and associated fittings
- on- and off-road vehicles
- portable pumps
- pipe laying laser
- rotating laser
- profiles
- automatic level
- communication equipment
- breathing apparatus
- gas detection equipment
- rescue equipment
- appropriate personal protective equipment.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and

## RANGE STATEMENT

- Pipes* may include:
- induction programs
  - relevant community planning and development agreements, such as land care agreements.
  - vitrified clay
  - reinforced concrete
  - polyvinyl chloride (PVC)
  - polyethylene
  - cast iron
  - ductile iron cement lined
  - glass reinforced piping
  - mild steel cement lined.
- Fittings* may include:
- jointing systems for pipe types, e.g. gibault
  - tension bands
  - solvent cement joints
  - compression ring joints
  - bolted flanges
  - cathodic protection
  - electrofusion
  - butt welding.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# NWP251B Construct open earthen channels or drains

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to plan and prepare for the construction of open channels or drains and to complete construction operations and subsequent site restoration according to legislative and organisational requirements.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff involved in the construction of earthen channels and drains for stormwater or irrigation systems or the remodelling or reconstruction of unserviceable systems.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for construction work.</b>	<p>1.1 Determine <b><i>work requirements</i></b> from design plans, specifications, instructions and work orders.</p> <p>1.2 Check site and identify <b><i>hazards</i></b> according to <b><i>legislative and organisational requirements</i></b>.</p> <p>1.3 Make appropriate <b><i>drainage and diversion arrangements</i></b> without damage to environment.</p> <p>1.4 Check <b><i>equipment</i></b> and open-cut excavation methods to ensure that safety requirements of task and site are met.</p> <p>1.5 <b><i>Prepare site</i></b> according to specifications and organisational requirements.</p>
<b>2 Construct channels or drains.</b>	<p>2.1 Construct earthen channels, drains and batters to planned width, depth and gradient.</p> <p>2.2 Compact soil, apply additives if necessary, and take earth samples to meet organisational requirements.</p> <p>2.3 Check construction works to ensure that specifications are met.</p>
<b>3 Restore work site and equipment.</b>	<p>3.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>3.2 Restore work site and add <b><i>environmental improvements or controls</i></b> to complete work according to plans and organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- interpret plans, charts and instructions
- apply procedures and standards
- apply channel, drain and batter construction techniques
- identify soil types, mechanics and compaction rates
- select and operate appropriate compaction plant, such as tamping foot and smooth drum roller
- operate communication systems
- perform work-related calculations
- communicate with employees and customers
- work effectively as part of a team
- use literacy skills in regard to verbal and written communication in the workplace
- give and receive instructions.

#### **Required knowledge:**

- channel and drain system design basics
- channel and drain system layout
- environmental aspects of construction
- channel, drain and batter construction processes
- measures to reduce channel deterioration, infestation of weeds, pests and seepage
- relevant utilities and service providers
- safe use of lasers
- use of automatic levels
- basic levelling techniques
- profiles and boning rods
- survey principles
- soil types, mechanics and compaction rates
- capabilities of plant used for construction, including equipment operation, capacity and limitations
- communication systems
- work-related calculations
- hazardous materials handling
- landscape and ground structure of work area

## **REQUIRED SKILLS AND KNOWLEDGE**

- risk factors and potential hazards of construction processes
- effects of weather and conditions on construction site or plant
- control systems.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to construct open earthen channels and drains by:

- planning work and preparing work site according to given specifications and instructions
- cutting channels to specification
- compacting soil
- taking soil samples
- checking that work meets specifications
- cleaning and storing equipment
- restoring work site.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- confirmation of site availability
- confirmation of statutory approvals, including:
  - vegetation clearing approval
  - riverine protection permits
  - use of borrow approvals
  - preparations for conditions included in statutory approvals for work
- site boundaries
- borrow and spoil areas
- boundary protection
- location, timing and type of work activity
- extent of the work
- access roads
- specifications for depth, width and gradient
- utility location
- safe work methods.

***Hazards*** may include:

- damage to other utilities
- soil types and suitability to cut
- those associated with particular plant and equipment.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Drainage and diversion arrangements*** may include:

- statutory approvals and conditions
- environmental.

***Equipment*** may include:

- hand and power tools
- on- and off-road vehicles
- off-road plant
- lifting and winching equipment
- compressors

## RANGE STATEMENT

- rotating lasers
  - profiles
  - automatic level
  - pneumatic spaders and attachments
  - motorised cutting equipment
  - portable pumps
  - communication equipment
  - breathing apparatus
  - gas detection equipment
  - rescue equipment
  - appropriate personal protective equipment.
  - installation of temporary erosion control structures
  - cultural heritage monitors
  - safety barricades
  - removal of vegetation, debris, silt and soil.
  - revegetation processes
  - drainage measures
  - sedimentation control.
- Site preparation* may include:
- Environmental improvements or controls* may include:

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# **NWP252B Construct and install irrigation delivery and stormwater drainage assets**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to construct irrigation delivery or stormwater drainage assets on site and to install both constructed assets and prefabricated components.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with specific responsibility for ensuring that the construction and installation of irrigation or stormwater drainage assets is completed in a safe and timely manner.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	<p>1.1 Determine <b><i>work requirements</i></b> from specifications and instructions.</p> <p>1.2 Select, fit and use personal protective equipment.</p> <p>1.3 Perform site check to identify hazards and prevent damage to other utilities according to <b><i>legislative and organisational requirements</i></b>.</p> <p>1.4 Provide appropriate drainage and diversion from work site without damage to environment.</p> <p>1.5 Check <b><i>equipment</i></b> and excavation methods to meet safety requirements of task and site.</p>
<b>2 Construct and install drains, channels, pipes and associated fittings.</b>	<p>2.1 Provide bedding and foundations according to <b><i>structure</i></b> type, location and specification.</p> <p>2.2 Select, lay and install join <b><i>pipes</i></b> and <b><i>fittings</i></b> according to manufacturer and organisational requirements.</p> <p>2.3 Select, place and join prefabricated components according to manufacturer and organisational requirements.</p> <p>2.4 Check installed pipes, fittings and prefabricated components to ensure that test specifications are met.</p> <p>2.5 Construct cast in situ components according to specifications and organisational requirements.</p>
<b>3 Finalise work.</b>	<p>3.1 Check constructions and installations to ensure that specifications are met.</p> <p>3.2 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>3.3 Backfill, compact and restore work site to meet environmental and organisational requirements.</p> <p>3.4 Maintain workplace records as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- interpret plans, charts and instructions
- perform work-related calculations
- apply procedures and standards
- communicate with employees and customers
- work effectively as part of a team
- use communication equipment
- use literacy skills in regard to verbal and written communication in the workplace
- give and receive instructions.

#### **Required knowledge:**

- system hydraulics basics
- system layout
- environmental aspects of construction
- construction processes
- relevant utilities and service providers
- communication systems
- hazardous materials handling
- landscape and ground structure of work area
- risk factors and potential hazards of construction processes
- equipment operation, capacity and limitations
- effects of weather and conditions on construction site or plant
- control systems
- pre-cast components
- pipes and fittings.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to construct and install irrigation delivery or stormwater drainage assets by:

- planning work and preparing work site according to given specifications and instructions
- constructing assets according to specifications
- installing assets according to specifications
- checking that work meets specifications
- cleaning and storing equipment
- restoring work site
- completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- extent and scope of work
- work site boundaries
- utilities location
- risk assessment and prevention measures
- signage
- traffic control.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment*** used may include:

- hand and power tools
- on- and off-road vehicles
- lifting and winching equipment
- mechanical excavation equipment
- compressors
- pneumatic spaders and attachments
- motorised cutting equipment
- chemical spraying apparatus
- small marine craft
- trenching systems
- portable pumps
- communication equipment
- breathing apparatus
- gas detection equipment
- rescue equipment
- appropriate personal protective equipment.

***Structures*** may include:

- drop structures
- regulators
- erosion barriers
- head walls

## **RANGE STATEMENT**

*Pipes* may include:

- concrete channels.
- vitrified clay
- polyvinyl chloride (PVC)
- polyethylene
- reinforced concrete.

*Fittings* may include:

- jointing systems for pipe types and prefabricated sections, e.g. gibault and tension bands
- tension bands
- solvent cement joints
- compression rings
- bolted flanges
- malleable jointing materials
- electrofusion
- butt welding.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## **NWP253B Install and repair water services**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to install and repair water service pipes running from the main supply to the consumer connection.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with specific responsibility for ensuring that water pipes are installed and repaired in a safe and timely manner.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for service installation.</b>	<p>1.1 Determine <i>work requirements</i> for installation of services from plans, specifications and organisational procedures.</p> <p>1.2 Determine materials and configuration from plans, specifications and organisational procedures.</p> <p>1.3 Determine location of other utilities and services according to <i>legislative and organisational requirements</i>.</p> <p>1.4 Identify and apply system operation requirements.</p> <p>1.5 Select, fit and use <i>equipment</i>, including personal protective equipment.</p> <p>1.6 Determine location, size and number of tappings from plans, specifications and organisational procedures.</p>
<b>2 Drill and tap main pipe.</b>	<p>2.1 Set up and operate tapping machine according to manufacturer specifications and organisational procedures.</p> <p>2.2 Install main tap according to specifications and organisational requirements.</p> <p>2.3 Recognise and correct faults or malfunctions in drilling and tapping.</p> <p>2.4 Apply corrosion protection measures where required.</p>
<b>3 Install conduits under roads and pathways.</b>	<p>3.1 Coordinate installation of conduits with road and path construction.</p> <p>3.2 Install conduits according to specifications, drawings and organisational requirements.</p>
<b>4 Install pipes and fittings.</b>	<p>4.1 Measure <i>pipes</i> and cut to length within acceptable tolerance for length and squareness.</p> <p>4.2 Prepare pipe ends and make <i>joints</i> according to manufacturer specifications.</p> <p>4.3 Set out configuration of pipes and <i>fittings</i> according to plans, specifications and organisational requirements, with allowance for thermal movement if required.</p> <p>4.4 Recognise and correct joining faults or malfunctions.</p> <p>4.5 Select bedding and backfill material and place according to manufacturer specifications and organisational requirements.</p>
<b>5 Maintain water system hygiene.</b>	<p>5.1 Store service pipes and fittings clear of potential pollutants or damaging substances and remove debris or filling from pipes before installation.</p> <p>5.2 Flush service pipe work before final commissioning.</p> <p>5.3 Plug pipe openings during work breaks.</p>
<b>6 Locate and repair leaks.</b>	<p>6.1 Determine locations of leaks and isolate and dewater.</p> <p>6.2 Identify and apply electrical safety procedures.</p>

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
	6.3 Identify and apply appropriate repair techniques to maintain integrity of service.
<b>7 Test water service.</b>	7.1 Apply test or operational pressures to service and all joints. 7.2 Check pipes, connections and fittings are operable without leakage under test or operational conditions.
<b>8 Finalise work.</b>	8.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures. 8.2 Restore work site to meet environmental and organisational requirements. 8.3 Complete workplace records and process as required.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- install and repair service pipes and fittings
- identify control system faults
- use safety equipment and personal protective equipment
- use tools and equipment
- identify hazards
- work effectively as part of a team
- perform work-related calculations
- identify and respond to operational problems
- use communication systems
- interpret plans, instructions and procedures
- follow procedures and standards
- complete documentation
- use literacy skills in regard to verbal and written communication in the workplace
- communicate with customers and other employees.

#### **Required knowledge:**

- OHS procedures
- personal work site safety
- risk factors
- equipment operation
- environmental aspects of service installation
- pipe systems and installation requirements
- characteristics of pipe materials
- work-related calculations
- systems' operation
- testing systems
- corrosion principles applicable to service pipes and fittings
- operation of water meters.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to install and repair water services between the main supply and customer connection by:

- planning work and preparing work site
- performing installation and repair tasks according to manufacturer specifications and legislative and organisational requirements
- ensuring system hygiene and operational performance
- checking work, restoring work site, storing equipment and completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- confined spaces
- lifting and moving materials in a trench.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment*** used may include:

- hand and power tools
- lifting and winching equipment
- mechanical excavation equipment
- pneumatic and motorised equipment
- pressure drilling and tapping machines
- pipe cutting and bending apparatus
- thread cutting equipment
- communication equipment
- bridging clamps
- insulating gloves
- personal protective equipment.

***Pipes*** may include:

- copper
- polybutylene
- brass
- polyethylene
- polyvinyl chloride (PVC)
- galvanised steel.

***Joints*** may be:

- threaded
- electrofusion
- push fit
- solvent welded
- butt welded
- compression

## **RANGE STATEMENT**

*Fittings* may include:

- silver soldered.
- tapping bands
- main taps
- ferrules
- ball valves
- dirt boxes
- meter boxes.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## NWP254B Repair or insert water distribution assets

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to repair water distribution assets and insert or cut in fittings and valves.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with specific responsibility for ensuring that repair of water distribution assets is completed in a safe and timely manner.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for repairs.</b>	1.1 Determine work requirements and location for repair of <b><i>assets</i></b> from specifications and instructions. 1.2 Select and check <b><i>equipment</i></b> and tools required to meet safety requirements of task and site. 1.3 Select, fit and use personal protective equipment. 1.4 Advise customers of supply interruption. 1.5 Isolate the work area.
<b>2 Repair or insert assets.</b>	2.1 Repair or replace leakages and damaged pipes and <b><i>fittings</i></b> according to specifications. 2.2 Carry out internal and external protection of assets to meet specifications. 2.3 Pressurise and check repaired distribution assets to ensure that joints are sound.
<b>3 Maintain system hygiene and water quality.</b>	3.1 Store pipes and fittings clear of potential pollutants or damaging substances and remove debris or filling from pipes before use. 3.2 <b><i>Sterilise fittings</i></b> and repair materials, disinfect and take samples. 3.3 Keep trench water levels below pipe level.
<b>4 Review, record and report work.</b>	4.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures. 4.2 Complete workplace records and process as required. 4.3 Restore work site to meet environmental and organisational requirements. 4.4 Determine and report apparent cause of asset failure by visual examination of removed components.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- use safety equipment and personal protective equipment
- use tools and machinery
- follow plans, charts, specifications and instructions
- perform work-related calculations
- apply policies and procedures
- identify hazards
- communicate with employees and customers
- work effectively as part of a team
- use communication systems
- give and receive instructions
- identify system faults
- install and repair the appropriate systems' fittings and assets
- use literacy skills in regard to verbal and written communication in the workplace
- apply appropriate surface protection and clean system and structures.

#### **Required knowledge:**

- system hydraulics basics
- system layout
- environmental aspects of maintenance
- lock-out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- work-related calculations
- hazardous materials handling
- landscape and ground structure of work area
- risk factors and potential hazards of maintenance processes
- equipment operation, capacity and limitations
- effects of weather and conditions on construction site or plant
- control systems
- pipes and fittings
- disinfection of systems and chemical usage.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to conduct repair work on water distribution assets by:

- planning work and preparing work site
- performing repair tasks according to manufacturer specifications and organisational requirements
- ensuring system hygiene and water quality
- checking work, restoring work site, storing equipment and completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

## EVIDENCE GUIDE

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Assets* may include:
- distribution system pipe work, including:
  - polyvinyl chloride (PVC)
  - polyethylene
  - mild steel cement lined
  - ductile iron cement lined
  - cast iron cement lined
  - asbestos cement
  - copper
  - glass reinforced piping
  - structures, including:
  - meter pits
  - maintenance holes
  - valve chambers
  - regulators
  - erosion barriers
  - head walls
  - thrust blocks
  - controlling equipment.
- Equipment* used may include:
- hand and power tools
  - lifting and winching equipment
  - mechanical excavation equipment
  - pneumatic and motorised equipment, including:
  - compressors
  - pneumatic spades and attachments
  - motorised cutting equipment
  - on- and off-road vehicles
  - portable pumps
  - leak clamps
  - communication equipment
  - breathing apparatus
  - gas detection equipment
  - rescue equipment
  - appropriate personal protective equipment.

## **RANGE STATEMENT**

*Fittings* may include:

- hydrants
- sluices
- valves
- scours
- main taps
- jointing and repair systems for pipe types, e.g. gibault
- tapping bands
- tension bands
- solvent cement joints
- compression ring joints
- bolted flanges
- electrofusion
- butt welding
- cathodic protection.

*Sterilising fittings* may include:

- air scouring
- sterilising pipeline and repair pieces
- sampling and testing
- scrubbing
- flushing.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## **NWP255B Maintain and repair wastewater collection assets**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to maintain and repair pipes, drains and wastewater collection assets.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with responsibility for ensuring that wastewater collection assets are maintained and repaired in a safe and timely manner.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for maintenance.</b>	<p>1.1 Determine work requirements for maintenance and repair of <b><i>assets</i></b> from working drawings, plans, specifications and instructions.</p> <p>1.2 Select and check <b><i>equipment and tools</i></b> required to meet safety requirements of task and site.</p> <p>1.3 Select, fit and use personal protective equipment.</p>
<b>2 Conduct maintenance and repair work.</b>	<p>2.1 Locate and remove system chokes and blockages to achieve maximum system performance.</p> <p>2.2 Repair or replace leakages and damaged assets to meet test specifications.</p> <p>2.3 Repair or replace structures as required to meet operational, <b><i>legislative and organisational requirements</i></b>.</p> <p>2.4 Check maintained and repaired assets to ensure that specifications have been met.</p>
<b>3 Finalise work.</b>	<p>3.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>3.2 Complete workplace records and process as required.</p>



## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- install and repair appropriate assets
- clear chokes and blockages
- maintain assets
- identify and respond to operational problems
- use communication systems
- perform work-based calculations
- follow drawings, plans, specifications and instructions
- apply policies and procedures
- use safety and personal protective equipment
- work effectively as part of a team
- use tools and machinery
- identify hazards
- communicate with customers and other employees
- use literacy skills in regard to verbal and written communication in the workplace
- record work activities.

#### Required knowledge:

- system hydraulics basics
- system layout
- system calculations
- environmental aspects of construction and maintenance
- lock-out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- risk factors and potential hazards of locating underground utilities and services
- risk factors and potential hazards of installation and maintenance processes
- hazardous materials handling
- landscape and ground structure of work area
- equipment operation, capacity and limitations
- effects of weather and conditions on construction site or plant
- control systems
- pipes and fittings
- OHS procedures
- personal work site safety
- component parts
- repair and maintenance standard operating 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to conduct maintenance and repair work on wastewater collection assets by:

- planning and preparing work site
- performing maintenance and repair tasks on pipe work and structures according to manufacturer specifications and organisational requirements
- checking work, restoring work site, storing equipment and completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Assets*** may include:

- collection system's pipe work, including:
  - vitrified clay
  - reinforced concrete
  - polyvinyl chloride (PVC)
  - polyethylene
  - cast iron cement lined
  - ductile iron cement lined
  - glass reinforced piping
  - mild steel cement lined
  - structures, including:
    - meter pits
    - valve pits
    - drop structures
    - regulators
    - erosion barriers
    - person access chambers and pits
    - head walls
    - thrust blocks
    - inspection shafts
    - controlling equipment
    - fittings, including:
      - jointing systems for pipe types, e.g. gibault
      - tension bands
      - solvent cement joints
      - compression ring joints
      - bolted flanges
      - cathodic protection
      - electrofusion
      - butt-welding.
- hand and power tools
- lifting and winching equipment
- mechanical excavation equipment
- local repair by electronic means, including:
  - top hats

***Equipment and tools*** may include:

## RANGE STATEMENT

- patches
  - pneumatic and motorised equipment, including:
  - compressors
  - pneumatic spades and attachments
  - motorised cutting equipment
  - conventional and jet rodding systems
  - on- and off-road vehicles
  - portable pumps
  - communication equipment
  - closed circuit television (CCTV) equipment to survey repairs
  - breathing apparatus
  - gas detection equipment
  - rescue equipment
  - appropriate personal protective equipment.
  - relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development agreements, such as land care agreements.
- Legislative and organisational requirements* may include:

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# NWP256B Monitor and report water distribution systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to inspect water distribution systems, detect faults and report on water distribution system performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with responsibility for ensuring that water distribution system performance complies with legislative and organisational requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor distribution system performance.</b>	<p>1.1 Conduct <b><i>routine inspections</i></b> of <b><i>supply networks</i></b> and report faults according to organisational procedures.</p> <p>1.2 Select <b><i>equipment</i></b> and inspection methods to meet task and site safety requirements.</p> <p>1.3 Collect data on system performance and usage and report according to <b><i>legislative and organisational requirements</i></b>.</p>
<b>2 Monitor water quality.</b>	<p>2.1 Collect and record water samples according to organisational requirements.</p> <p>2.2 Monitor water quality according to organisational requirements.</p>
<b>3 Identify system non-conformance</b>	<p>3.1 Investigate and report consumer complaints according to organisational requirements.</p> <p>3.2 Record and report leakages, and damaged pipes and fittings according to organisational requirements.</p> <p>3.3 Identify and report <b><i>system faults</i></b> and operational condition of network according to organisational requirements.</p> <p>3.4 Investigate and report pressure and flow fluctuations outside acceptable limits according to organisational requirements.</p>



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- follow plans, instructions and policies
- perform system calculations
- apply inspection and testing procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- work effectively as part of a team
- identify system faults
- use literacy skills in regard to verbal and written communication in the workplace
- identify hazards.

#### **Required knowledge:**

- system hydraulics basics
- system layout
- system calculations
- environmental aspects of maintenance
- lock-out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- landscape and ground structure of work area
- risk management principles
- risk factors and potential hazards of inspection processes
- equipment operation, capacity and limitations
- effects of weather and conditions on system operation and plant
- control systems
- pipes and fittings.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to inspect water distribution systems, detect faults and report on water distribution system performance including:

- monitoring and reporting on performance of water distribution systems, including water quality
- identifying and reporting leakages or damage to system components
- identifying and reporting operational conditions falling outside performance specifications
- processing consumer complaints.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

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(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Routine inspections*** may include:

- interaction and communication with other employees, other authorities and general public
- visual observation
- implementation of reporting procedures that may also include procedures for implementation of by-laws, organisational policies and statutory requirements.

***Supply networks*** may include:

- distribution system pipe work, including:
- polyvinyl chloride (PVC)
- polyethylene
- mild steel cement lined
- ductile iron cement lined
- cast iron cement lined
- asbestos cement
- copper
- glass reinforced piping
- structures, including:
- meter pits
- person access chambers or pits
- valve chambers
- regulators
- erosion barriers
- head walls
- thrust blocks
- pumping stations
- consumer services
- meters
- fittings, including:
- hydrants
- sluices
- valves
- scours
- main taps
- jointing systems for pipe types, e.g. gibault
- tapping bands

## RANGE STATEMENT

- tension bands
  - solvent cement joints
  - compression ring joints
  - bolted flanges
  - electrofusion
  - butt welding
  - backflow prevention devices
  - cathodic protection.
- Equipment* may include:
- hand and power tools
  - lifting equipment
  - mechanical excavation equipment
  - electronic monitoring and metering systems
  - recording systems
  - motorised equipment
  - on- and off-road vehicles
  - communication equipment
  - breathing apparatus
  - gas detection equipment
  - rescue equipment
  - appropriate personal protective equipment.
- Legislative and organisational requirements* may include:
- relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development agreements, such as land care agreements.
- System faults* may include:
- loss of pressure
  - leakage
  - odour
  - turbidity and colour
  - loss of flow.

## Unit Sector(s)

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP257B Maintain and repair wastewater collection systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to investigate reported problems in wastewater collection systems and to conduct appropriate maintenance and repair work on wastewater collection assets.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with specific responsibility for ensuring that repairs and maintenance of wastewater collection systems are conducted in a safe and timely manner.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Investigate reported system problems.</b>	1.1 Investigate customer complaints. 1.2 Locate problems using inspection points and system fault location techniques. 1.3 Identify organisational and customer responsibilities for faults. 1.4 Select remedial action according to organisational procedures.
<b>2 Plan and prepare for maintenance and repair.</b>	2.1 Determine <b><i>work requirements</i></b> for maintenance and repair of <b><i>assets</i></b> from specifications and instructions. 2.2 Select and check <b><i>equipment and tools</i></b> required to meet task and site safety requirements. 2.3 Select, fit and use personal protective equipment.
<b>3 Maintain and repair assets, pipes and fittings.</b>	3.1 <b><i>Control flows</i></b> to allow maintenance and repair of assets. 3.2 Repair or replace leakages and damaged assets according to organisational procedures. 3.3 Select <b><i>fittings</i></b> and tools and lay or join assets according to manufacturer guidelines and organisational requirements. 3.4 Conduct preventative maintenance according to organisational maintenance programs. 3.5 Locate system chokes and blockages and arrange removal. 3.6 Perform cleaning and flushing according to <b><i>legislative and organisational requirements</i></b> . 3.7 Inspect minor structures and determine and apply appropriate repair techniques.
<b>4 Finalise work.</b>	4.1 Check, maintain and store equipment, tools and materials to manufacturer guidelines and organisational procedures. 4.2 Restore work site to meet environmental and organisational requirements.



## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify and respond to operational problems
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- follow plans, charts and instructions
- perform work-related calculations
- apply policies
- apply monitoring procedures and standards
- communicate effectively with employees and customers
- work effectively as part of a team
- use communication systems
- give and receive instructions
- identify system faults
- use literacy skills in regard to verbal and written communication in the workplace
- identify hazards.

#### Required knowledge:

- system hydraulics basics
- system layout
- environmental aspects of maintenance
- customer and organisational responsibilities for blockages
- standards and procedures for organisational repair and maintenance
- lock-out procedures for mechanical and electrical installations
- closed circuit television (CCTV) and other methods of monitoring
- relevant utilities and service bodies
- communication systems
- safety procedures
- hazardous materials handling
- landscape and ground structure of work area
- risk factors and potential hazards of monitoring processes
- equipment operation
- capacity and limitations
- effects of weather and conditions on system operation and plant
- control systems
- pipes and fittings
- disinfection of systems and chemical usage.



## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to maintain and repair wastewater collection assets by:

- investigating reported faults
- negotiating with customers
- applying organisational procedures to selection of system fault solutions
- preparing equipment, tools and work sites
- conducting maintenance and repair of pipes, fittings and small structures
- reporting blockages
- cleaning and flush systems
- clearing work site
- completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- location and extent of work
- location of utilities
- site boundary protection and traffic control
- hazards, risks and preventative solutions.

***Assets*** may include:

- collection system pipe work, including:
  - polyvinyl chloride (PVC)
  - polyethylene
  - vitrified clay
  - concrete
  - mild steel cement lined
  - ductile iron cement lined
  - cast iron cement lined
  - asbestos cement
  - glass reinforced piping
- structures, including:
  - meter pits
  - maintenance holes, chambers, traps or pits
  - valve chambers
  - regulators
  - erosion barriers
  - thrust blocks
  - pumping stations.

***Equipment and tools*** may include:

- basic hand and power tools
- electronic monitoring and metering systems
- recording systems
- on- and off-road vehicles
- communication equipment
- computerised equipment
- CCTV
- pipe and cable detection equipment
- leak detection equipment
- motorised equipment
- portable pumps
- communication equipment

## **RANGE STATEMENT**

- breathing apparatus
  - gas detection equipment
  - rescue equipment
  - appropriate personal protective equipment.
- Flow control* may include:
- admission of trade waste
  - odours
  - infiltration and exfiltration
  - electronic and manual controlling systems
  - pumping systems, including:
    - centrifugal
    - positive displacement
  - valving systems, including:
    - sluice
    - gate
    - non-return
    - blade
  - metering systems, including:
    - bubbler tube
    - ultrasonic
    - magnetic meter.
- Fittings* may include:
- sluices
  - valves
  - scours
  - main taps
  - jointing systems for pipe types, e.g. gibault
  - tapping bands
  - tension bands
  - solvent cement joints
  - compression ring joints
  - bolted flanges
  - electrofusion
  - butt welding
  - backflow prevention devices
  - cathodic protection.
- Legislative and organisational requirements* may include:
- relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development

**RANGE STATEMENT**

agreements, such as land care agreements.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Collection and distribution

## **NWP258B Monitor and operate bulkwater transfer systems**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor and operate bulkwater transfer systems.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with specific responsibility for ensuring that the operation of bulk water transfer systems complies with legislative and organisational requirements.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare work.</b>	<p>1.1 Determine <b><i>work requirements</i></b> for operation and monitoring of <b><i>bulkwater transfer systems</i></b> are in line with specifications and instructions.</p> <p>1.2 Perform site check to prevent damage to other utilities and the environment, according to <b><i>legislative and organisational requirements</i></b>.</p> <p>1.3 Select and check <b><i>equipment</i></b> to meet safety requirements of task and site and select, fit and use personal protective equipment.</p> <p>1.4 Identify pumping stations and follow correct operating procedures.</p>
<b>2 Monitor system performance and usage.</b>	<p>2.1 Conduct routine monitoring programs according to organisational maintenance schedules.</p> <p>2.2 Identify fluctuations in demand and system changes causing dirty water.</p> <p>2.3 Collect, analyse and record data on system performance and usage according to organisational requirements.</p> <p>2.4 Collect and record water samples according to organisational requirements.</p>
<b>3 Regulate flow.</b>	<p>3.1 Monitor and <b><i>adjust flow regulating systems</i></b> to meet demand requirements, according to organisational procedures.</p> <p>3.2 <b><i>Regulate</i></b> and divert flows to facilitate repair or emergency activities.</p> <p>3.3 Conduct isolation and inspection of transfer systems.</p>
<b>4 Regulate pressure.</b>	<p>4.1 Monitor and adjust pressure to meet optimum delivery performance, according to organisational procedures.</p> <p>4.2 Investigate and report <b><i>pressure fluctuations</i></b> according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- operate bulkwater systems
- identify and respond to operational problems
- collect data
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- follow plans, charts, specifications and instructions
- perform work-related calculations
- apply procedures and standards
- communicate with employees and customers
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- identify system faults
- use literacy skills in regard to verbal and written communication in the workplace
- identify hazards.

#### **Required knowledge:**

- system hydraulics basics
- system layout
- environmental aspects of operation
- lock-out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- landscape and ground structure of work area
- risk factors and potential hazards of operating water transfer systems
- equipment operation, capacity and limitations
- effects of weather and conditions on systems, site or plant
- pumps
- weirs
- valves
- flow meters
- run time meters
- diurnal variations
- wet and dry pumpwells

## **REQUIRED SKILLS AND KNOWLEDGE**

- illegal connections
- control systems
- disinfection of systems and chemical usage.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor and operate bulkwater transfer systems by:

- planning and preparing for work
- monitoring transfer system performance
- collecting and recording data
- regulating water flow
- regulating water pressure.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

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demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Work requirements*** may include:

- work site boundaries
- extent and scope of work
- risk assessment and preventative measures
- utility location.

***Bulkwater transfer systems*** may include:

- in-line pumping stations
- high and low range pumps
- incline meters
- scour chambers and air valves
- service reservoirs
- pipes, including:
  - polyvinyl chloride (PVC)
  - polyethylene
  - mild steel cement lined
  - ductile iron cement lined
  - cast iron cement lined
  - asbestos cement
  - copper
  - glass reinforced piping
- structures, including:
  - pumping stations
  - meter pits
  - person access chambers or pits
  - valve chambers
  - regulators
  - erosion barriers
  - head walls
  - thrust blocks.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development

## RANGE STATEMENT

*Equipment* used may include:

- agreements, such as land care agreements.
- hand and power tools
- lifting equipment
- metering equipment
- sluices
- control devices
- on- and off-road vehicles
- portable pumps
- communication equipment
- breathing apparatus
- gas detection equipment
- rescue equipment
- appropriate personal protective equipment.

*Adjustment of flow regulation systems* may include:

- use of rating tables to determine:
- release rates
- valve positions.

*Regulation* of the system will include operation of:

- pumping systems, including:
- centrifugal
- submersible
- positive displacement
- valving systems, including:
- sluice
- gate
- blade
- non-return
- electronic and manual controlling systems
- service reservoirs.

*Pressure fluctuations* may include:

- high
- low
- outside acceptable limits.

## Unit Sector(s)

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution



# NWP259B Operate, monitor and maintain pump stations

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to operate and monitor the performance of pump stations in water and wastewater systems and undertake minor maintenance, or organise more complex maintenance, of pump stations according to organisational operating procedures.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with specific responsibility for ensuring that pump stations operate according to organisational requirements. This may include minor maintenance tasks, such as gland adjustment, packing replacement and the replacement of some fittings.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare work.</b>	<p>1.1 Determine <i>pump station work requirements</i> from standard operating and maintenance procedures.</p> <p>1.2 Access and interpret <i>pump operation and maintenance procedures</i>.</p> <p>1.3 Perform site check to prevent damage to other utilities and the environment, according to <i>legislative and organisational requirements</i>.</p> <p>1.4 Select and check <i>equipment</i> to meet safety requirements of task and site and select, fit and use personal protective equipment.</p> <p>1.5 Handle, use and store <i>chemicals</i> according to organisational requirements.</p>
<b>2 Operate pump stations.</b>	<p>2.1 Identify and set or adjust <i>pump station components</i> according to organisational requirements.</p> <p>2.2 Carry out routine security inspections and cleaning duties.</p> <p>2.3 Operate pump station according to organisational requirements.</p>
<b>3 Maintain pump stations.</b>	<p>3.1 Apply <i>pump station maintenance standards</i>.</p> <p>3.2 Inspect pump station components according to organisational requirements, and identify <i>maintenance needs</i>.</p> <p>3.3 Schedule maintenance tasks and order appropriate <i>materials</i>.</p> <p>3.4 Conduct maintenance tasks according to organisational maintenance standards and manufacturer recommendations.</p> <p>3.5 Identify and report <i>pump station faults</i> and carry out minor repairs.</p>
<b>4 Monitor and adjust pump station performance.</b>	<p>4.1 Apply pump station performance targets.</p> <p>4.2 Identify and apply <i>monitoring points and timing</i>.</p> <p>4.3 Monitor pump station and make <i>adjustments</i>, where necessary, to maintain operational parameters.</p>
<b>5 Check outsourced maintenance work.</b>	<p>5.1 Check that completed maintenance and repairs meet specifications.</p> <p>5.2 Check return of pumping station to service.</p>
<b>6 Finalise work.</b>	<p>6.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and organisational procedures.</p> <p>6.2 Restore work site to meet environmental and organisational requirements.</p> <p>6.3 Maintain workplace records as required.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- operate pumps and pumping stations
- maintain pumps and pumping stations
- identify system faults
- identify hazards
- implement remedial action
- operate service according to procedures
- identify and respond to operational problems
- collect data
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- follow plans and instructions
- perform work-related calculations
- apply procedures and standards
- communicate with employees and customers
- work effectively as part of a team
- use communication systems
- use literacy skills in regard to verbal and written communication in the workplace
- give and receive instructions.

#### **Required knowledge:**

- system hydraulics basics, including suction and lift
- system layout
- principles and purpose of pump operation
- OHS requirements
- types of pump and their operational function
- pump and pump station operation and maintenance procedures and standards
- principles affecting selection of pump station monitoring points and timing of monitoring activities
- environmental aspects of operation
- lock-out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- risk factors and potential hazards of operating wastewater transfer systems
- equipment operation, capacity and limitations

## **REQUIRED SKILLS AND KNOWLEDGE**

- effects of weather and conditions on system
- control systems
- pump station components
- high and low voltage requirements
- effect of lightning strikes.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to cooperate and monitor the performance of pump stations in water and wastewater systems and undertake minor maintenance including:

- planning and preparing for work, including selecting equipment and chemicals
- operating pump stations, including conducting a security inspection
- conducting pump station maintenance
- monitoring and adjusting pump station performance
- checking quality of outsourced maintenance work
- finalising work, including completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Pump station work requirements*** may include:
- location
  - timing
  - site boundary protection
  - type of pumps
  - extent of maintenance
  - maintenance methods.
- Pump operation and maintenance procedures*** may include:
- gland packing
  - gland adjustment
  - removal and replacement of valves or instruments.
- Legislative and organisational requirements*** may include:
- relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development agreements, such as land care agreements.
- Equipment*** used may include:
- hand and power tools
  - high pressure cleaning equipment
  - lifting equipment
  - on- and off-road vehicles
  - portable pumps
  - communication equipment
  - breathing apparatus
  - gas detection equipment
  - rescue equipment
  - appropriate personal protective equipment.
- Chemicals*** may include:
- cleaning chemicals
  - oils
  - greases
  - paints
  - thinners.
- Pump station components***
- suction pipes



## **RANGE STATEMENT**

may include:

- valves
- pumps
- electrical cabinets
- pumps
- weirs
- flow meters
- run time meters
- wet and dry pump wells
- electrical motors.

*Pump station maintenance standards* may include:

- electrical
- mechanical
- civil construction.

*Maintenance needs* may include:

- painting
- adjusting glands
- replacing corroded items, such as bolts
- cleaning
- removing fat and solids build up.

*Materials* may include:

- metal
- masonry
- wood.

*Pump station faults* may include:

- flow fluctuations outside acceptable limits
- over-heating bearing
- blocked suction lines
- vibrating drive shaft
- broken impellers.

*Monitoring points and timing* may include:

- routine inspections of flow rate
- inspections to identify infiltration and obstructions.

*Adjustments* may include:

- flow
- use of night and day rate power.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP260A Monitor and report water treatment processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and report on water treatment processes within potable community and industrial water treatment plants in urban and rural areas.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff in water treatment plants with responsibility for monitoring and reporting on water treatment processes.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Identify characteristics of water purity and reasons for treatment of potable water.</b>	<p>1.1 Identify characteristics of water affecting its physical, chemical and microbiological acceptability.</p> <p>1.2 Identify <b><i>reasons and requirements</i></b> for treatment of water.</p>
<b>2 Monitor and report on water quality.</b>	<p>2.1 Clearly identify water treatment <b><i>processes</i></b> and determine their application.</p> <p>2.2 Identify organisation's water quality parameters and check characteristics of <b><i>water quality</i></b> according to relevant legislation and organisational procedures.</p> <p>2.3 Record and report water quality according to organisational procedures.</p>
<b>3 Follow safety requirements for work in a water treatment plant.</b>	<p>3.1 Identify and record hazards of working in a water treatment plant.</p> <p>3.2 Identify and record operational requirements for safe and effective use of <b><i>equipment</i></b>.</p> <p>3.3 Select, fit and use safety equipment, including personal protective equipment.</p>
<b>4 Monitor and report on water treatment.</b>	<p>4.1 Identify operating principles used in water treatment processes.</p> <p>4.2 Complete records required for effective operation of a water treatment plant.</p> <p>4.3 Identify, record and report range of data routinely collected.</p> <p>4.4 Identify data that falls outside normal operating range and report for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- apply policies, procedures and standards
- recognise and report operational problems
- use safety equipment and personal protective equipment
- select, collect and test samples
- interpret material safety data sheets (MSDS)
- receive and apply instructions
- use literacy skills in regard to verbal and written communication in the workplace
- communicate with other employees and people that interact within the work environment.

#### **Required knowledge:**

- operating principles of water treatment processes
- basic water chemistry
- water uses and demands, both domestic and industrial
- physical, chemical and microbiological characteristics of water within the water treatment process
- water quality guidelines
- reasons for water treatment
- types of treatment plants and processes
- major chemicals and equipment used
- physical and chemical hazards
- reasons for data and information collection.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor and report on water treatment processes within potable community and industrial water treatment plants in urban and rural areas including:

- identifying characteristics and importance of water quality
- establishing organisational water quality standards
- checking and recording water quality characteristics
- applying safety procedures in a potable water treatment plant
- collecting and recording routine data on water treatment plant processes.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Reasons and requirements*** for water treatment include:

- ensuring conformity with standards and guidelines, including Australian Drinking Water Guidelines
- removal of impurities, contaminants and pollution
- impact of impurities on water treatment processes
- relevant water and environment legislation and regulations
- hazard analysis critical control point (HACCP) operational philosophy.

Water treatment ***processes*** may include:

- screens
- coagulation and flocculation
- sedimentation clarification
- dissolved air flotation
- granular and membrane filtration
- disinfection
- aeration and oxidation
- fluoridation
- reverse osmosis
- ion exchange
- activated carbon adsorption
- calibration of dosing equipment
- softening
- backwash water treatment.

***Water quality*** characteristics may include:

- physical
- chemical
- microbiological.

***Equipment*** used may include:

- pumps, including:
  - centrifugal
  - positive displacement
  - airlift
  - blowers and compressors
  - mixers and chemical batching facilities
  - control valves
  - electronic digital monitoring systems
  - recording systems



## **RANGE STATEMENT**

- chemical testing and analysis equipment
- communication equipment
- manual or hydraulic equipment
- personal protective equipment.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# NWP261A Operate and maintain water treatment plant and equipment

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to operate water treatment processes within potable community and industrial water treatment plants in urban and rural areas. The ability to operate water treatment processes in compliance with relevant water legislation and regulations, and Australian Drinking Water Guidelines is vital to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff in water treatment plants with responsibility for the practical and safe operation of plant, equipment and processes.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Operate water treatment processes.</b>	<p>1.1 Identify <b><i>reasons and requirements</i></b> for treatment of water.</p> <p>1.2 Identify major components of <b><i>water treatment processes</i></b>.</p> <p>1.3 Identify and apply practices undertaken in water treatment processes.</p> <p>1.4 Operate <b><i>mechanical equipment</i></b> used in water treatment according to manufacturer specifications and organisational requirements.</p> <p>1.5 Handle, use, store and dose <b><i>chemicals</i></b> according to organisational procedures.</p>
<b>2 Maintain items of equipment used in water treatment processes.</b>	<p>2.1 Identify maintenance requirements and schedules according to standard operating procedures.</p> <p>2.2 Complete maintenance and cleaning requirements of equipment.</p>
<b>3 Follow safety requirements for work in a water treatment plant.</b>	<p>3.1 Identify and record hazards of working in a water treatment plant.</p> <p>3.2 Identify and record operational requirements for the safe and effective use of equipment.</p> <p>3.3 Select, fit and use safety equipment, including personal protective equipment.</p> <p>3.4 Identify and apply safe work practices when handling chemicals and working in a water treatment plant.</p>
<b>4 Complete documentation.</b>	<p>4.1 Complete records required for effective operation of a water treatment plant according to organisational requirements.</p> <p>4.2 Identify and record range of data routinely collected.</p> <p>4.3 Identify data that falls outside normal operating parameters and report for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- apply policies, procedures and standards
- recognise and report operational problems
- use safety equipment and personal protective equipment
- collect and test samples
- interpret material safety data sheets (MSDS)
- receive and apply instructions
- use literacy skills in regard to verbal and written communication in the workplace
- communicate with other employees and people that interact within work environment.

#### **Required knowledge:**

- water cycle
- sources of water
- uses of water, both domestic and industrial
- physical, chemical and microbiological characteristics of water within the water treatment process
- water quality characteristics
- reasons for water treatment
- types of treatment plants and processes
- major chemicals and equipment used
- water treatment plant hazards
- safety equipment
- reasons for data and information collection.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to operate water treatment processes within potable community and industrial water treatment plants in urban and rural areas including:

- applying water treatment processes, including operating mechanical equipment
- using chemicals safely and according to organisational procedures
- conducting regular routine inspection of mechanical equipment
- identifying hazards and applying appropriate safety procedures
- gathering and recording data
- reporting anomalies.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Reasons and requirements*** for treatment include:

- ensuring conformity with standards and guidelines, including Australian Drinking Water Guidelines
- removal of impurities, contaminants and pollution
- impact of impurities on water treatment processes
- relevant water legislation and regulations relating to water and the environment
- hazard analysis critical control point (HACCP) operational philosophy.

***Water treatment processes*** may include:

- screens
- coagulation and flocculation
- sedimentation clarification
- dissolved air flotation
- granular and membrane filtration
- disinfection
- aeration and oxidation
- fluoridation
- reverse osmosis
- ion exchange
- activated carbon adsorption
- calibration of dosing equipment
- softening
- backwash water treatment.

***Mechanical equipment*** may include:

- pumps, including:
  - centrifugal
  - positive displacement
  - airlift
- blowers and compressors
- mixers and chemical batching facilities
- control valves
- electronic digital monitoring systems
- recording systems
- chemical testing and analysis equipment
- communication equipment
- flow meters

## RANGE STATEMENT

*Chemicals* and aids used may include:

- alarms and process control systems
- centrifuge
- belt filter press
- screens, including raked bar screens
- manual or hydraulic equipment.
- lime
- soda ash
- aluminium and iron coagulants
- polymers
- chlorine
- fluoride
- carbon dioxide.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment



# NWP262A Monitor and report wastewater treatment processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and report on wastewater treatment processes within domestic and industrial wastewater treatment plants in urban and rural areas. The ability to monitor processes to ensure that wastewater disposal or re-use meets state or territory licensing requirements is essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff in wastewater treatment plants with responsibility for monitoring wastewater treatment processes.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Identify sources and characteristics of wastewater and reasons for wastewater treatment.</b>	<p>1.1 Identify <i>wastewater sources</i> and characteristics.</p> <p>1.2 Identify <i>reasons</i> and <i>statutory requirements</i> for wastewater treatment.</p>
<b>2 Monitor and report on wastewater quality.</b>	<p>2.1 Identify <i>wastewater treatment processes</i> and determine their application.</p> <p>2.2 Check <i>characteristics of wastewater</i> according to organisational procedures.</p> <p>2.3 Record and report wastewater quality according to organisational procedures.</p>
<b>3 Follow safety requirements for work in a wastewater treatment plant.</b>	<p>3.1 Identify and record hazards of working in a wastewater treatment plant.</p> <p>3.2 Identify operational requirements for safe and effective use of <i>equipment</i>.</p> <p>3.3 Select, fit and use safety equipment, including personal protective equipment.</p> <p>3.4 Identify and apply safe work practices when handling <i>chemicals</i> and working in a wastewater treatment plant.</p>
<b>4 Monitor and report on wastewater treatment.</b>	<p>4.1 Identify operating principles used in wastewater treatment processes.</p> <p>4.2 Complete records required for effective operation of a wastewater treatment plant.</p> <p>4.3 Identify, record and report range of <i>data</i> routinely collected.</p> <p>4.4 Carry out, record and report <i>process calculations</i>.</p> <p>4.5 Identify data that falls outside normal operating <i>parameters</i> and report for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- apply policies, procedures and standards
- recognise and report operational problems
- use safety equipment and personal protective equipment
- select, collect and test samples
- interpret material safety data sheets (MSDS)
- receive and apply instructions
- use literacy skills in regard to verbal and written communication in the workplace
- communicate with other employees and people that interact within the work environment.

#### **Required knowledge:**

- sources of wastewater
- physical, chemical and microbiological characteristics and operating principles related to wastewater treatment
- reasons for wastewater treatment
- types of wastewater treatment plant processes
- major chemicals and equipment used
- wastewater treatment plant hazards
- safety equipment
- reasons for data and information collection.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor and report on wastewater treatment processes within domestic and industrial wastewater treatment plants in urban and rural areas including:

- performing, recording and reporting process measurements and calculations
- demonstrating procedures for starting and stopping plant and locking out control equipment
- adjusting process controls according to specific plant procedures
- recording and reporting faults and breakdowns
- identifying common process faults and following procedures to rectify these.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

## EVIDENCE GUIDE

experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Wastewater sources*** may include:

- domestic
- industrial
- storm
- ground.

***Reasons for treatment*** may include:

- ensuring conformity with legislation, regulations, standards and codes
- removal of impurities and contaminants to enable discharge or re-use
- reducing impact of impurities on the environment and public health.

***Statutory requirements*** are defined by:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Wastewater treatment processes*** may include:

- grit removal
- aeration
- screening
- sedimentation
- disinfection
- granular and membrane filtration
- thickening and dewatering
- suspended and fixed media aerobic bioreactor processes
- anaerobic processes
- lagoons and wetlands
- gas scrubbers
- biosolids and effluent disposal and re-use
- dilution
- chemical dosing
- nutrient removal
- reverse osmosis.

## RANGE STATEMENT

*Characteristics of wastewater* may include:

- types of impurities, such as:
- organic
- inorganic
- micro-organisms
- public health considerations.

*Equipment* used may include:

- pumps, including:
- centrifugal
- positive displacement
- airlift
- blowers
- screens
- control valves
- electronic digital monitoring systems
- recording systems
- chemical testing and analysis equipment
- communication equipment
- belt press
- centrifuge
- comminutor
- flow meters
- flow recorders
- manual or hydraulic equipment
- personal protective equipment.

*Chemicals* and major equipment used may include:

- chemicals and lime
- sodium hypochlorite
- aluminium and iron coagulants
- polymers.

*Data* may include:

- instantaneous flow rate
- flow records
- temperature
- sand and grit
- pH
- chemical oxygen demand
- dissolved oxygen
- settleable solids concentration (cone test)
- thirty minute settleability test
- sludge blanket level
- residual chlorine
- microscopic examination
- conductivity.



## **RANGE STATEMENT**

*Process calculations* may include:

- average dry weather flow
- peak dry weather flow
- chemical feed rate and concentration
- process efficiency.

Wastewater quality *parameters* may include:

- physical
- chemical
- microbiological.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# NWP263A Operate and maintain wastewater treatment plant and equipment

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to operate and maintain wastewater treatment processes within domestic and industrial wastewater treatment plants in urban and rural areas. The ability to operate wastewater treatment processes to ensure that wastewater disposal or re-use meets state or territory licensing requirements is essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff in wastewater treatment plants with responsibility for the practical and safe operation of plant, equipment and processes.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Operate wastewater treatment processes.	1.1 Identify <b><i>reasons and requirements</i></b> for treatment of wastewater. 1.2 Identify major components of wastewater treatment processes. 1.3 Identify and apply practices undertaken in <b><i>wastewater treatment processes</i></b> . 1.4 Operate <b><i>mechanical equipment</i></b> used in wastewater treatment according to manufacturer specifications and organisational requirements. 1.5 Handle, use, store and dose <b><i>chemicals</i></b> according to relevant legislation and organisational procedures.
2 Maintain items of equipment used in wastewater treatment processes.	2.1 Identify maintenance requirements and schedules according to standard operating procedures. 2.2 Meet maintenance and cleaning requirements of equipment.
3 Follow safety requirements for work in a wastewater treatment plant.	3.1 Identify and record hazards of working in a wastewater treatment plant. 3.2 Identify and record operational requirements for safe and effective use of equipment. 3.3 Select, fit and use safety equipment, including personal protective equipment. 3.4 Identify and apply safe work practices when handling chemicals and working in a wastewater treatment plant.
4 Record wastewater treatment plant data.	4.1 Complete records required for effective operation of a wastewater treatment plant. 4.2 Identify, record and report range of data routinely collected. 4.3 Identify data that falls outside normal operating parameters and report for further action.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- recognise and report operational problems
- apply policies, procedures and standards
- use safety equipment and personal protective equipment
- collect and test samples
- interpret material safety data sheets (MSDS)
- receive and apply instructions
- use literacy skills in regard to verbal and written communication in the workplace
- communicate with other employees and people that interact within the work environment.

#### **Required knowledge:**

- sources and characteristics of wastewater
- physical, chemical and microbiological characteristics and basic principles related to wastewater treatment
- reasons for wastewater treatment
- types of wastewater treatment plants and processes
- major chemical types and equipment used
- wastewater treatment plant hazards
- safety equipment
- reasons for data and information collection
- MSDS.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to operate and maintain wastewater treatment processes within domestic and industrial wastewater treatment plants in urban and rural areas including:

- applying wastewater treatment processes, including operating mechanical equipment
- using chemicals safely, as required and according to organisational procedures
- conducting regular routine inspection of mechanical equipment
- identifying hazards and applying appropriate safety procedures
- gathering and recording data
- reporting anomalies.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Reasons and requirements*** for treatment may include:

- ensuring conformity with legislation, standards and guidelines
- removing impurities and contaminants to enable discharge and re-use
- reducing impact of impurities on environment and public health
- relevant environmental protection legislation and regulations and trade waste agreements.

***Wastewater treatment processes*** may include:

- grit removal
- aeration
- screening
- sedimentation
- disinfection
- granular and membrane filtration
- thickening and dewatering
- anoxic processes
- sludge digestion
- suspended and fixed media aerobic bioreactor processes
- anaerobic processes
- lagoons and wetlands
- gas scrubbers
- biosolids and effluent disposal and re-use
- dilution
- chemical dosing
- nutrient removal
- reverse osmosis.

***Mechanical equipment*** used may include:

- pumps, including:
  - centrifugal
  - positive displacement
  - airlift
  - blowers
  - screens
  - control valves
- electronic digital monitoring systems

## RANGE STATEMENT

*Chemicals* and aids used may include:

- recording systems
- chemical testing and analysis equipment
- communication equipment
- manual and hydraulic equipment
- personal protective equipment.
- lime
- sodium hypochlorite
- polymers
- aluminium and iron coagulants
- carbon sources.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment



# NWP264B Monitor, operate and report wastewater pre-treatment processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and report on wastewater pre-treatment processes, including separation processes such as screens and grit removal, used in industrial or domestic wastewater treatment plants prior to biological treatments.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with specific responsibility for ensuring that pre-treatment processes comply with legislative and organisational requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	<p>1.1 Determine work requirements from specifications and instructions.</p> <p>1.2 Identify and report potential risks to self, other employees, public and environment.</p> <p>1.3 Select and check work site <b><i>equipment, tools and safety materials</i></b> as appropriate to meet task and safety specifications.</p> <p>1.4 Select, fit and use personal protective equipment according to <b><i>organisational requirements</i></b>.</p>
<b>2 Monitor pre-treatment processes.</b>	<p>2.1 Carry out <b><i>routine plant inspections</i></b> according to standard operating procedures.</p> <p>2.2 Monitor <b><i>processes</i></b> to maintain parameters of operation.</p> <p>2.3 Collect process samples and conduct standard <b><i>tests</i></b>.</p> <p>2.4 Collect, record and report process data according to organisational and plant requirements.</p> <p>2.5 Identify and report process faults and operational condition of plant according to organisational requirements.</p>
<b>3 Operate pre-treatment processes.</b>	<p>3.1 Operate pre-treatment processes according to specifications and organisational procedures.</p> <p>3.2 Initiate <b><i>system adjustments</i></b> to enhance system performance according to system specifications and organisational procedures.</p> <p>3.3 Handle, use, store and dose chemicals according to organisational procedures.</p>
<b>4 Review, report and record work.</b>	<p>4.1 Check, maintain and store equipment, tools and materials according to manufacturer guidelines and environmental and organisational procedures.</p> <p>4.2 Compile <b><i>reports</i></b> from plant and system data to meet organisational requirements.</p> <p>4.3 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and report operational problems
- produce reports and logs
- use safety and personal protective equipment
- follow plans, charts, specifications and instructions
- sample and test process stream
- perform work-related calculations
- apply procedures and standards
- communicate with employees and customers
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- identify control system faults
- use literacy skills in regard to verbal and written communication in the workplace
- sample and test products.

#### **Required knowledge:**

- principles of and need for effective pre-treatment
- system layout
- lock-out procedures for mechanical and electrical installations
- policies, procedures and legislation applied to wastewater pre-treatment processes
- relevant utilities and service bodies
- communication systems
- work-related calculations
- chemicals for odour or pH control
- hazardous materials handling
- environment, landscape and ground structure of work area
- risk factors and potential hazards related to water or wastewater treatment
- chemical dosing processes
- equipment operation, capacity and limitations
- pumping and valving systems
- control systems
- impacts of hydraulic loads on processes.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and report on wastewater pre-treatment processes including:

- planning and preparing for work
- collecting and labelling samples and performing tests
- inspecting plant and monitoring processes
- collecting and recording data
- operating and adjusting processes
- recording all required information.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Equipment, tools and safety materials*** may include:

- electronic monitoring and metering systems
- recording systems
- basic hand and power tools
- sampling and laboratory testing and equipment
- computerised equipment
- communication equipment
- personal protective equipment.

***Organisational requirements*** may include:

- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs which may refer to legislation and/or regulations
- relevant community planning and development agreements, such as land care agreements.

***Routine plant inspections*** may include:

- interaction and communication with other employees, other authorities and general public
- visual observation
- identification of corrosion damage.

***Processes*** may include:

- screening
- gravity and aerated grit chambers
- gross pollution traps
- removal and disposal of screenings
- shredding
- odour removal
- oily water separators
- riffle plate separators.

***Tests*** may include:

- settling tests
- pH
- dissolved oxygen
- suspended solids
- chemical oxygen demand.

***System adjustments*** may include:

- pH correction
- dissolved oxygen levels
- flow control
- screen rotation frequency

## **RANGE STATEMENT**

- Reports* may include:
- solids removal
  - chemical additions.
  - plant performance data
  - chemical usage.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# NWP268B Monitor, operate and report chlorine disinfection systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and operate chlorine disinfection systems and to report on process quality control.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with specific responsibility for ensuring that chlorine disinfection systems comply with organisational requirements. For staff working on chlorine disinfection systems where liquefied chlorine gas is used, the unit NWP277A Work safely with liquefied chlorine gas, is essential.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	<p>1.1 Determine work requirements according to <i>legislative and organisational requirements</i>.</p> <p>1.2 Select and check <i>equipment</i> required to meet safety requirements of task and site.</p> <p>1.3 Select, fit and use personal protective equipment.</p>
<b>2 Monitor systems performance.</b>	<p>2.1 Monitor chlorine <i>disinfection systems</i> according to agreed schedule and procedures.</p> <p>2.2 Collect process samples and conduct standard <i>tests</i>.</p> <p>2.3 Maintain and monitor relevant OHS requirements.</p> <p>2.4 Collect and report process data according to organisational and disinfection system requirements.</p> <p>2.5 Make system adjustments as required to maintain effectiveness of chlorine disinfection.</p>
<b>3 Prepare and apply chemical dosing.</b>	<p>3.1 Handle, use and store <i>chemicals</i> according to environmental and organisational requirements.</p> <p>3.2 Prepare chemical dosing according to system specifications and organisational requirements and apply using appropriate <i>chlorine dosing equipment</i>.</p> <p>3.3 Maintain information related to chlorine supply and usage according to statutory requirements.</p>
<b>4 Complete documentation.</b>	<p>4.1 Compile records from plant and system data to meet organisational requirements.</p> <p>4.2 Report observations outside defined parameters for further action.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify and respond to operational and process faults with chlorine dosing equipment problems
- produce reports and logs
- use safety and personal protective equipment
- follow plans, charts and instructions
- apply policies, standard operating procedures and regulatory standards
- collect and test samples
- communicate with employees and customers
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- perform work-related calculations
- prepare and apply chlorine dosing
- operate computerised equipment
- identify control system faults
- identify hazards
- perform microbiological and chlorine residual sampling
- use literacy skills in regard to verbal and written communication in the workplace
- interpret material safety data sheets (MSDS).

#### Required knowledge:

- properties and chemistry of chlorine
- pH
- microbiological water quality guidelines
- chlorine system layout
- lock-out procedures for mechanical and electrical installations
- policies, standard operating procedures and legislation
- communication systems
- hazardous substances handling
- risk factors and potential hazards associated with chlorination
- work-related chlorine calculations
- chlorine dosing processes
- equipment operation, capacity and limitations
- pumping and valving systems
- automatic feed rate control systems
- MSDS.



## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and report on chlorine disinfection systems by:

- scheduling work
- selecting and using appropriate tools and equipment, including personal protective equipment
- monitoring chlorine disinfection systems
- collecting process samples and performing standard tests
- collecting and reporting process data
- preparing and applying chlorine dosing safely
- producing reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Legislative and organisational requirements*** may include:
- relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development agreements, such as land care agreements.
- Equipment*** may include:
- electronic monitoring and metering systems
  - recording systems
  - basic hand and power tools
  - sampling and laboratory testing equipment
  - computerised equipment
  - on- and off-road vehicles
  - communication equipment
  - personal protective equipment.
- Disinfection systems*** may include:
- liquefied chlorine gas
  - sodium hypochlorite
  - calcium hypochlorite.
- Tests*** may include:
- chlorine residuals
  - pH.
- Chemicals*** may include:
- liquefied chlorine gas
  - sodium hypochlorite
  - calcium hypochlorite
  - pH correcting chemicals, such as:
  - sodium hydroxide
  - lime
  - soda ash.
- Chlorine dosing equipment*** may include:
- vacuum gas or liquid chlorinator
  - hypochlorite dosing pump
  - calcium hypochlorite tablet dispenser.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Treatment

# NWP270B Monitor, operate and report basic anaerobic processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and operate anaerobic processes and report on system performance within domestic and industrial wastewater treatment plants.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with specific responsibility for operating anaerobic processes in treatment plants and checking that the processes comply with organisational requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	<p>1.1 Determine work requirements according to <b><i>legislative and organisational requirements</i></b>.</p> <p>1.2 Select and check <b><i>equipment</i></b> required to meet safety requirements of task and site.</p> <p>1.3 Select, fit and use personal protective equipment.</p>
<b>2 Monitor and operate basic anaerobic process performance.</b>	<p>2.1 Carry out <b><i>anaerobic process</i></b> inspections according to planned schedules.</p> <p>2.2 Collect process samples and conduct standard <b><i>tests</i></b>.</p> <p>2.3 Collect and report process data according to organisational and plant requirements.</p> <p>2.4 Monitor processes to ensure that parameters of operation are maintained.</p> <p>2.5 Identify and report process faults and operational condition of plant according to organisational requirements.</p> <p>2.6 Carry out basic <b><i>system adjustments</i></b> according to organisational requirements to enhance system performance.</p> <p>2.7 Handle, use, store and dose chemicals according to organisational procedures.</p>
<b>3 Complete documentation.</b>	<p>3.1 Compile records from plant and system data to meet organisational requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and report operational problems
- produce reports and logs
- use safety equipment and personal protective equipment
- follow plans, charts and instructions
- perform system calculations
- apply procedures and standards
- communicate with employees and customers
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- identify system faults
- use literacy skills in regard to verbal and written communication in the workplace
- sample and test products.

#### **Required knowledge:**

- anaerobic process principles
- system layout
- lock-out procedures for mechanical and electrical installations
- policies, procedures and legislation relating to water treatment
- communication systems
- hazardous materials handling
- explosion hazards
- risk factors and potential hazards
- basic system calculations
- chemical dosing processes
- hydraulic detention times
- equipment operation, capacity and limitation.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and report on basic anaerobic processes by:

- planning and conducting routine inspections
- monitoring system processes
- reporting process and structural faults
- performing system adjustments
- completing system performance-monitoring documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

## EVIDENCE GUIDE

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment*** may include:

- electronic monitoring and metering systems
- recording systems
- basic hand and power tools
- sampling and laboratory testing equipment
- computerised equipment
- on- and off-road vehicles
- communication equipment
- personal protective equipment.

***Anaerobic processes*** may include:

- upflow anaerobic sludge blanket
- hybrid reactors
- fluidised bed reactors
- heated fully mixed reactors
- anaerobic lagoons.

***Tests*** may include:

- settling
- volatile fatty acids
- temperature
- pH.

***System adjustments*** may include:

- pH correction
- mixing
- chemical additions
- sludge wasting
- temperature
- influent feed rate.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Treatment

# NWP271B Monitor, operate and report sedimentation processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and operate non-chemically assisted sedimentation processes within domestic and industrial wastewater treatment plants or stormwater systems. The required outcomes also include reporting on the sedimentation system performance and process quality control within these systems.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with responsibility for checking that sedimentation processes comply with organisational performance requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	1.1 Determine work requirements according to <i>legislative and organisational requirements</i> .
	1.2 Select and check <i>equipment</i> required to meet safety requirements of task and site.
	1.3 Select, fit and use personal protective equipment.
<b>2 Monitor and operate sedimentation processes.</b>	2.1 Carry out sedimentation process inspections according to type of plant.
	2.2 Collect process samples and conduct standard <i>tests</i> .
	2.3 Collect and report process data according to organisational and plant requirements.
	2.4 Monitor <i>processes</i> to maintain parameters of operation.
	2.5 Identify and report process faults and operational condition of plant according to organisational requirements.
	2.6 Carry out basic <i>system adjustments</i> to enhance system performance according to organisational requirements.
<b>3 Report sedimentation processes.</b>	3.1 Compile records from plant and system data to meet organisational requirements.
	3.2 Report observations outside defined parameters for further action.



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- use safety equipment and personal protective equipment
- follow plans, charts and instructions
- perform system calculations
- apply procedures and standards
- communicate with employees and various customers
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- identify control system faults
- use literacy skills in regard to verbal and written communication in the workplace
- sample and test products.

#### **Required knowledge:**

- principles that form the basis of sedimentation processes
- system layout
- lock-out procedures for mechanical and electrical installations
- policies, procedures and legislation relating to water treatment
- communication systems
- risk factors and potential hazards
- basic system calculations
- equipment operation, capacity and limitations
- effects of changes in hydraulic load on sedimentation processes.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and report on sedimentation processes by:

- planning and conducting routine plant inspections
- monitoring system processes
- reporting process and structural faults
- performing system adjustments
- completing system performance monitoring documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

## EVIDENCE GUIDE

experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment*** used may include:

- electronic monitoring and metering systems
- recording systems
- basic hand and power tools
- sampling and laboratory testing equipment
- computerised equipment
- communication equipment
- personal protective equipment.

***Tests*** may include:

- pH
- dissolved oxygen
- settleable solids concentration (cone test)
- suspended solids
- temperature
- total solids concentration.

***Processes*** may include:

- Imhoff tanks
- conventional clarifiers and sedimentation tanks
- lamellar thickeners
- picket fence thickeners
- gross pollution traps
- primary treatments, such as primary sedimentation
- oily water separators
- riffle plate separators.

***System adjustments*** may include:

- sludge withdrawal rates
- scum removal
- inflow control.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Treatment

## **NWP272B Monitor, operate and report wastewater lagoon processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor and operate wastewater lagoon processes and report on system performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with responsibility for checking that lagoon processes comply with organisational requirements.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	<p>1.1 Determine work requirements according to <b><i>legislative and organisational requirements</i></b>.</p> <p>1.2 Select and check <b><i>equipment</i></b> required to meet safety requirements of task and site.</p> <p>1.3 Select, fit and use personal protective equipment.</p>
<b>2 Monitor performance.</b>	<p>2.1 Carry out routine inspections according to particular lagoon system and organisational requirements.</p> <p>2.2 Collect process samples and conduct standard <b><i>tests</i></b>.</p> <p>2.3 Collect and report process data according to organisational and lagoon system requirements.</p>
<b>3 Operate and control lagoon processes.</b>	<p>3.1 Monitor <b><i>processes</i></b> to maintain parameters of operation.</p> <p>3.2 Identify and report process faults and operational condition of plant according to organisational requirements.</p> <p>3.3 Carry out basic <b><i>system adjustments</i></b> within defined parameters to enhance system performance according to organisational requirements.</p> <p>3.4 Handle, use and store chemicals according to organisational requirements.</p>
<b>4 Complete documentation.</b>	<p>4.1 Maintain <b><i>records</i></b> of plant and system data according to organisational requirements.</p> <p>4.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- use safety equipment and personal protective equipment
- follow plans, charts and instructions
- perform system calculations
- apply procedures and standards
- communicate with colleagues, other employees and customers
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- identify control system faults
- use literacy skills in regard to verbal and written communication in the workplace
- sample and test products.

#### **Required knowledge:**

- biological principles of lagoon wastewater treatment processes
- system hydraulics basics
- system layout
- lock-out procedures for mechanical and electrical installations
- policies, procedures and legislation relating to wastewater management
- communication systems
- hazardous materials handling
- environment, landscape and ground structure of work area
- risk factors and potential hazards related to lagoon wastewater treatment
- system calculations
- chemical dosing processes
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pumping and valving systems.



## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and report on wastewater lagoon processes, including:

- planning and conducting routine inspections
- monitoring system processes
- reporting process and structural faults
- performing system adjustments
- preparing and applying chemical dosing
- completing system performance-monitoring documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment*** used may include:

- electronic monitoring and metering systems
- recording systems
- basic hand and power tools
- sampling and laboratory testing equipment
- computerised equipment
- on- and off-road vehicles
- communication equipment
- personal protective equipment.

***Tests*** may include:

- settling
- microscopic observation
- pH
- dissolved oxygen
- electrical conductivity
- temperature
- odour
- visual observation of:
  - colour
  - scum
  - insects
  - birdlife
  - weed growth
- redox potential.

***Processes*** may include:

- primary, secondary and maturation lagoons
- aerated lagoons
- winter storages.

***System adjustments*** may

- pH correction

## **RANGE STATEMENT**

include:

- mixing
- flow control
- water level
- dissolved oxygen levels
- recirculation rates
- chemical additives.
- plant performance data
- chemical usage.

*Records* and data compiled may include:

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# NWP273A Monitor, operate and report ultraviolet irradiation disinfection systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and operate ultraviolet (UV) irradiation disinfection systems and to report on microbiological quality control.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with specific responsibility for ensuring that UV irradiation disinfection systems comply with organisational requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	<p>1.1 Determine work requirements according to <i>legislative and organisational requirements</i>.</p> <p>1.2 Select and check <i>equipment and tools</i> required to meet safety requirements of task and site.</p> <p>1.3 Select, fit and use personal protective equipment.</p>
<b>2 Monitor system performance.</b>	<p>2.1 Monitor <i>UV irradiation disinfection systems</i> according to agreed schedule and procedures.</p> <p>2.2 Collect process samples and conduct standard microbiological <i>tests</i> as required.</p> <p>2.3 Maintain and monitor relevant OHS requirements.</p> <p>2.4 Collect and report process data according to organisational and disinfection system requirements.</p>
<b>3 Maintain and operate UV irradiation disinfection system.</b>	<p>3.1 Carry out routine inspections of <i>system components</i> according to organisational requirements.</p> <p>3.2 Clean and replace system components as required.</p> <p>3.3 Operate UV lamp sequencing according to organisational requirements.</p>
<b>4 Complete documentation.</b>	<p>4.1 Produce information relating to UV irradiation disinfection system maintenance and operation, according to organisational requirements.</p> <p>4.2 Review information and contribute to enterprise processes for continuous improvement and incident management.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to operational problems
- produce reports and logs
- use safety equipment
- use UV-absorbent personal protective equipment
- safe use of cleaning chemicals
- follow plans, charts and instructions
- apply policies, standard operating procedures and regulatory standards
- communicate effectively
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- perform work-related calculations
- operate computerised equipment
- identify control system faults
- identify hazards
- perform microbiological sampling
- use literacy skills in regard to verbal and written communication in the workplace
- interpret material safety data sheets (MSDS).

#### **Required knowledge:**

- properties of UV irradiation
- microbiological water quality guidelines
- UV irradiation disinfection system layout, including components
- lock-out procedures for mechanical and electrical installations
- policies, standard operating procedures and legislation
- communication systems
- safe use of cleaning chemicals and prevention of associated hazards
- risk factors and potential hazards associated with UV irradiation systems
- UV irradiation generation equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- MSDS.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and report on UV irradiation disinfection systems by:

- scheduling work
- selecting and using appropriate tools and equipment, including personal protective equipment
- monitoring UV irradiation disinfection systems
- collecting process samples and performing standard tests
- maintaining and operating UV irradiation disinfection systems
- collecting and reporting process data
- producing reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made



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when the assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment and tools*** may include:

- electronic monitoring and metering systems
- recording systems
- basic hand and power tools
- sampling and laboratory testing equipment
- computerised equipment
- personal protective equipment, such as:
  - UV-absorbent face shields
  - UV-absorbent safety goggles
  - UV-absorbent protective clothing.

***UV irradiation disinfection systems*** may include:

- low pressure mercury lamps
- medium pressure mercury lamps.

***Tests*** may include:

- UV absorbance
- turbidity
- suspended solids
- iron
- lamp intensity
- hardness.

***UV irradiation system components*** may include:

- power supply
- ballast
- lamps
- sleeves
- racks.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Treatment

# NWP274A Monitor, operate and report ozone treatment systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and operate ozone treatment systems and to report on process quality control.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with specific responsibility for ensuring that ozone treatment systems comply with organisational requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	1.1 Determine work requirements according to <b><i>legislative and organisational requirements</i></b> . 1.2 Select and check <b><i>equipment and tools</i></b> required to meet safety requirements of task and site. 1.3 Select, fit and use personal protective equipment.
<b>2 Monitor system performance.</b>	2.1 Monitor <b><i>ozone treatment systems</i></b> according to agreed schedule and procedures. 2.2 Collect process samples and conduct standard <b><i>tests</i></b> . 2.3 Maintain and monitor relevant OHS requirements. 2.4 Collect and report process data according to organisational and disinfection system requirements.
<b>3 Prepare and apply ozone dosing.</b>	3.1 Generate and dose ozone according to system specifications and organisational requirements. 3.2 Maintain information related to ozone generation and dosing according to organisational requirements.
<b>4 Complete and review reports.</b>	4.1 Produce information relating to system maintenance and operation according to organisational requirements. 4.2 Review information and contribute to enterprise processes for continuous improvement and incident management.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify and respond to operational problems
- produce reports and logs
- use safety and personal protective equipment
- follow plans, charts and instructions
- apply policies, regulatory standards and standard operating procedures
- communicate effectively
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- perform work-related ozone calculations
- prepare and apply ozone dosing
- operate computerised equipment
- identify control system faults
- identify hazards
- perform microbiological and ozone residual sampling
- use literacy skills in regard to verbal and written communication in the workplace
- interpret material safety data sheets (MSDS).

#### Required knowledge:

- properties and chemistry of ozone
- pH
- microbiological water quality guidelines
- ozone system layout
- lock-out procedures for mechanical and electrical installations
- policies, standard operating procedures and legislation
- communication systems
- hazardous substances handling
- risk factors and potential hazards associated with ozonation
- work-related ozone calculations
- ozone dosing processes
- operation, capacity and limitations of ozone generation equipment
- effects of weather and conditions on operation of site or plant
- pumping and valving systems
- automatic feed rate control systems
- MSDS.



## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and report on ozone treatment systems including:

- scheduling work
- selecting and using appropriate tools and equipment, including personal protective equipment
- monitoring ozone treatment systems
- collecting process samples and performing standard tests
- collecting and reporting process data
- preparing and applying ozone dosing safely
- producing reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence



## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment and tools*** may include:

- electronic monitoring and metering systems
- recording systems
- basic hand and power tools
- sampling and laboratory testing equipment
- computerised equipment
- on- and off-road vehicles
- communication equipment
- personal protective equipment.

***Ozone treatment systems*** may include:

- electric discharge ozone-generation system
- UV ozone-generation system.

***Tests*** may include:

- ozone residuals
- exhaust gas ozone concentration
- pH.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Treatment

# NWP275A Monitor, operate and report chlorine dioxide systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and operate chlorine dioxide systems and to report on process quality control.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with specific responsibility for ensuring that chlorine dioxide system processes comply with organisational requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	1.1 Determine work requirements according to <i>legislative and organisational requirements</i> . 1.2 Select and check <i>equipment and tools</i> required to meet safety requirements of task and site. 1.3 Select, fit and use personal protective equipment.
<b>2 Monitor system performance.</b>	2.1 Monitor <i>chlorine dioxide systems</i> according to agreed schedule and procedures. 2.2 Collect process samples and conduct standard <i>tests</i> . 2.3 Maintain and monitor relevant OHS requirements. 2.4 Collect and report process data according to organisational and disinfection system requirements.
<b>3 Prepare and apply chemical dosing.</b>	3.1 Handle, use and store <i>chemicals</i> according to organisational requirements. 3.2 Prepare chemical dosing according to system specifications and organisational requirements. 3.3 Maintain information related to chemical supply and usage according to statutory requirements.
<b>4 Complete documentation.</b>	4.1 Produce information relating to system maintenance and operation according to organisational requirements. 4.2 Review information and contribute to enterprise processes for continuous improvement and incident management.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify and respond to operational problems
- produce reports and logs
- use safety and personal protective equipment
- follow plans, charts and instructions
- apply policies, regulatory standards and standard operating procedures
- communicate effectively
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- perform work-related chlorine dioxide calculations
- prepare and apply chemical dosing
- operate computerised equipment
- identify control system faults
- identify hazards
- conduct microbiological and chlorine dioxide residual sampling
- use literacy skills in regard to verbal and written communication in the workplace
- interpret material safety data sheets (MSDS).

#### Required knowledge:

- properties and chemistry of chlorine dioxide
- pH
- microbiological water quality guidelines
- chlorine dioxide system layout
- lock-out procedures for mechanical and electrical installations
- policies, standard operating procedures and legislation
- communication systems
- hazardous substances handling
- risk factors and potential hazards associated with chlorine dioxide
- work-related chlorine dioxide calculations
- chlorine dioxide dosing processes
- chlorine dioxide generation equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pumping and valving systems
- automatic feed rate control systems
- MSDS.



## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and report on chlorine dioxide systems including:

- scheduling work
- selecting and using appropriate tools and equipment, including personal protective equipment
- monitoring chlorine dioxide disinfection systems
- collecting process samples and performing standard tests
- collecting and reporting process data
- preparing and applying chemical dosing safely
- producing reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## **EVIDENCE GUIDE**

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Legislative and organisational requirements*** may include:

- relevant federal and state or territory legislation and regulations
- codes of practice, associated standards and guidance material
- documented organisational policies, manuals and induction programs
- relevant community planning and development agreements, such as land care agreements.

***Equipment and tools*** may include:

- electronic monitoring and metering systems
- recording systems
- basic hand and power tools
- sampling and testing equipment
- computerised equipment
- communication equipment
- personal protective equipment.

***Chlorine dioxide systems*** may include:

- sodium chlorite/hydrochloric acid generating system
- sodium chlorite/sodium hypochlorite generating system
- sodium chlorite/liquefied chlorine gas generating systems.

***Tests*** may include:

- chlorine dioxide residuals
- pH.

***Chemicals*** may include:

- chlorine dioxide
- chemicals used for generation of chlorine dioxide
- pH correcting chemicals, such as:
- sodium hydroxide
- lime
- soda ash.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

## **NWP276A Monitor, operate and report fluoridation processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor and operate fluoridation processes and to report on water quality control.

### **Application of the Unit**

**Application of the unit** This unit is a skill set required by water operators responsible for fluoridation processes in water treatment. It may be a requirement for compliance with state and territory legislation and government water quality guidelines.

This unit of competency is a skills set for operators responsible for fluoridation processes in water treatment.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for work.</b>	<p>1.1 Determine work requirements according to <b><i>organisational requirements</i></b> and health and safety requirements.</p> <p>1.2 Select and check <b><i>equipment and tools</i></b> required to meet safety requirements of task and site.</p> <p>1.3 Select, fit and use <b><i>personal protective equipment</i></b>.</p>
<b>2 Monitor process performance.</b>	<p>2.1 Monitor <b><i>fluoridation processes</i></b> according to agreed schedule and procedures.</p> <p>2.2 Collect process samples and conduct standard <b><i>tests</i></b>.</p> <p>2.3 Maintain and monitor relevant OHS requirements.</p> <p>2.4 Collect <b><i>process data</i></b>, perform <b><i>calculations</i></b> and report according to organisational and fluoridation process requirements.</p>
<b>3 Prepare and apply fluoride dosing.</b>	<p>3.1 Handle, use and store <b><i>fluoridation chemicals</i></b> according to organisational requirements.</p> <p>3.2 Apply fluoride dosing and perform calculations according to organisational requirements.</p>
<b>4 Report on fluoridation processes.</b>	<p>4.1 Maintain information related to fluoride supply and usage according to organisational requirements.</p> <p>4.2 Produce information relating to maintenance and operation according to organisational requirements.</p> <p>4.3 Record information and submit according to organisational procedures for continuous improvement and incident management.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- identify and respond to operational problems
- produce reports and logs
- use safety and personal protective equipment
- follow plans, charts and instructions
- apply policies, regulatory standards and standard operating procedures relevant to fluoridation
- communicate effectively with colleagues to determine work requirements and report information using clear and direct communication appropriate for the audience and context
- work effectively as part of a team
- use organisation's communication equipment
- receive, clarify and confirm work instructions
- perform chemical dosing calculations
- prepare and apply fluoride dosing
- identify and report control system faults
- identify and report hazards
- perform fluoride residual sampling and testing
- use literacy skills to produce reports and logs and interpret a range of workplace documents
- interpret and follow material safety data sheets (MSDS).

#### Required knowledge:

- properties of fluoridation chemicals
- fluoridation and its relationship to public health
- fluoride sampling and record keeping
- fluoride addition points
- fluoride system layout and security
- lock-out procedures for mechanical and electrical installations
- policies and standard operating procedures for fluoride processes
- organisation's communication systems and procedures
- safe handling and disposal of fluoride compounds
- risk factors and potential hazards associated with fluoridation
- work-related fluoride calculations
- fluoride dosing processes
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pumping and valving systems

## **REQUIRED SKILLS AND KNOWLEDGE**

- automatic feed rate control systems
- MSDS.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and report on fluoridation processes by:

- scheduling work
- selecting and using appropriate tools and equipment, including personal protective equipment
- calculating average fluoride concentrations
- collecting process samples and determining fluoride residuals
- collecting and reporting process data
- preparing and applying fluoride dosing safely
- completing log sheets.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.



## Range Statement

### 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.

***Organisational requirements*** may include:

- codes of practice, associated standards and guidance material for the handling and control of fluoride processes
- organisational policies, manuals and induction programs
- occupational health and safety requirements.

***Equipment and tools*** may include:

- electronic monitoring and metering systems
- recording systems
- basic hand and power tools
- sampling and laboratory testing equipment
- computerised equipment
- off-road vehicles, such as forklift trucks
- organisation's communication equipment.

***Personal protective equipment*** may include:

- that specified in MSDS
- impervious rubber or plastic suits
- elbow-length gloves, apron and boots with long-sleeved shirt and long trousers
- for plants using dry fluoridating agents:
- full face mask with type 3 respiratory filter or chemical goggles and a half mask with P3 type respiratory filter (AS/NZS 1715 Selection, Use and Maintenance of Respiratory Protective Devices)
- for plants using liquid fluoridising agents:
- full face shield or splash-proof safety goggles.

***Fluoridation processes*** may include:

- solution feed such as:
- sodium fluoride solution feed
- sodium fluoride saturator system.
- dry chemical feeders, such as sodium fluorosilicate
- acid feed systems.

***Tests*** may include:

- fluoride residual analysis
- ion selective electrodes
- spectrophotometry/colorimetry, such as SPADNS method.

***Process data*** may include:

- volume of water treated
- quantity of fluoride added to the water

## **RANGE STATEMENT**

- Calculations* may include:
- stock fluoride on hand
  - results of fluoride residual analyses
  - calculated average fluoride concentrations.
  - average fluoride dosage or concentration
  - chemical dosing rate, given required fluoride dosage
  - fluoride dosage, given chemical dosing rate.
- Fluoridation chemicals* may include:
- sodium fluoride
  - sodium fluorosilicate
  - fluorosilicic acid.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# NWP277A Work safely with liquefied chlorine gas

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to work safely with liquefied chlorine gas, including the safe changeover of gas containers; safe transport, handling and storage of liquefied chlorine gas containers; and implementation of emergency procedures.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with specific responsibility for disconnecting and connecting liquefied chlorine gas containers in water and wastewater treatment plants.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare to work with liquefied chlorine gas.</b>	<p>1.1 Check work <i>procedures</i> and instructions for compliance with current <i>legislative and organisational requirements</i>.</p> <p>1.2 Check hazard signage for compliance with organisational requirements.</p> <p>1.3 Select and check <i>tools and equipment</i> required to ensure that safety requirements of task and site are met.</p> <p>1.4 Check <i>first aid provisions</i> for potential liquefied chlorine gas exposure hazards for compliance with organisational requirements.</p> <p>1.5 Select, fit and use <i>appropriate personal protective equipment</i>.</p>
<b>2 Perform liquefied chlorine gas container changeover procedures.</b>	<p>2.1 Obtain liquefied chlorine gas containers from the <i>correct storage area</i> and handle them according to organisational requirements.</p> <p>2.2 Conduct <i>disconnection procedures</i> according to organisational requirements.</p> <p>2.3 Conduct <i>connection procedures</i> according to organisational requirements.</p> <p>2.4 Transport depleted containers to correct storage area according to organisational requirements.</p> <p>2.5 Check and store tools and equipment according to organisational procedures.</p>
<b>3 Implement emergency procedures.</b>	<p>3.1 Locate and understand <i>emergency procedures</i>.</p> <p>3.2 Follow safe workplace procedures for emergency situations within scope of responsibilities.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- access, interpret and apply relevant legislative and organisational requirements
- access, interpret and apply safety procedures
- identify and report hazards
- apply first aid procedures according to job requirements
- select and use personal protective equipment
- use tools and equipment
- apply correct liquefied chlorine gas container procedures relating to:
  - transport, handling and storage
  - disconnection
  - connection
- perform work-related calculations
- operate a vacuum chlorinator safely during disconnection and reconnection procedures
- interpret material safety data sheets (MSDS)
- work effectively as part of a team
- complete records and logs
- use literacy skills in regard to verbal and written communication in the workplace
- communicate effectively in the workplace.

#### **Required knowledge:**

- personal protective equipment and its application
- emergency equipment and its application
- properties of liquefied chlorine gas
- basic function and components of vacuum chlorinator systems
- hazards of liquefied chlorine gas handling
- relevant MSDS
- procedures for liquefied chlorine gas container:
  - transport, handling and storage
  - disconnection
  - connection
- maintenance procedures for personal protective equipment.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to changeover liquefied chlorine gas containers safely and correctly, including:

- correctly selecting, fitting and using PPE, including air-supplied self-contained breathing apparatus
- implementing relevant Australian standards, MSDS requirements and other legislative and organisational requirements as applicable
- correctly transporting, handling and storing liquefied chlorine gas containers
- correctly disconnecting liquefied chlorine gas containers
- correctly connecting liquefied chlorine gas containers
- implementing emergency procedures relating to liquefied chlorine gas hazards.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Procedures*** may include:
- transport and handling of liquefied chlorine gas containers
  - liquefied chlorine gas container disconnection procedures
  - liquefied chlorine gas container connection procedures
  - storage of liquefied chlorine gas cylinders or drums.
- Legislative and organisational requirements*** may include:
- AS/NZS 2927 The storage and handling of liquefied chlorine gas
  - MSDS for liquefied chlorine gas
  - relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development agreements, such as land care agreements.
- Tools and equipment*** may include:
- wire brush
  - valve key.
- First aid provisions*** may include:
- cardiopulmonary resuscitation (CPR) instructions
  - safety shower
  - eyewash.
- Appropriate personal protective equipment (PPE)*** may include:
- protective clothing
  - safety footwear
  - chemical resistant gloves
  - air-supplied self-contained breathing apparatus.
- Correct storage area*** may include:
- indoor or shaded outdoor compound at treatment site or depot.
- Disconnection procedures*** may include:
- chlorinator shutdown and isolation
  - purging operations
  - leak testing.
- Connection procedures*** may include:
- component replacement
  - chlorinator start-up
  - leak testing



## **RANGE STATEMENT**

*Emergency procedures* may include:

- stand-by settings.
- raising alarm
- contacting appropriate personnel
- isolating liquefied chlorine gas containers
- evacuation procedures.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

## NWP278A Perform blue green algae sampling

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to collect and prepare water and wastewater samples for blue green algae identification, enumeration and toxicity testing according to standard operating procedures.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with specific responsibility for collecting blue green algae samples for identification, enumeration and toxicity testing.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for blue green algae sampling.</b>	<p>1.1 Confirm required <i>samples</i>, procedures for sampling and sampling locations according to <i>legislative and organisational requirements</i>.</p> <p>1.2 Select <i>sampling equipment</i> according to specified samples required and <i>sample preservation methods</i>.</p> <p>1.3 Select and check equipment and tools required to meet organisational requirements.</p> <p>1.4 <i>Plan sampling work activities</i> to comply with sampling plan and organisational requirements.</p>
<b>2 Conduct blue green algae sampling.</b>	<p>2.1 Collect samples, ensuring that sample types, <i>sampling locations</i> and sampling times comply with sampling plan.</p> <p>2.2 Maintain integrity of samples during sampling and label sample containers according to organisational requirements.</p> <p>2.3 Follow approved safety procedures to limit hazards and contamination to self, work area and environment.</p>
<b>3 Record and report data.</b>	<p>3.1 <i>Record</i> required information according to organisational requirements.</p> <p>3.2 Report observations or measurements outside organisational guidelines or specifications for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- prepare, collect, label and preserve blue green algae samples
- produce reports and logs
- plan work activities
- work effectively as part of a team
- identify and obtain resources
- follow plans and instructions
- apply procedures and standards
- communicate work requirements
- use literacy skills in regard to verbal and written communication in the workplace
- use personal protective equipment.

#### **Required knowledge:**

- types and purposes of blue green algae samples
- procedures and techniques for blue green algae sampling
- sample preparation, including:
  - prevention of contamination
  - volume of sample
  - appropriate containers
  - preservation
  - location selection
  - location maintenance
  - equipment
  - transportation
- documentation procedures for samples
- legislative and organisational policies, procedures and standards
- communication systems
- work planning processes
- hazards associated with collection of blue green algae samples.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to perform blue green algae sampling, including:

- planning and preparing for sampling tasks
- collecting samples according to sampling plan
- maintaining integrity of samples
- recording required information.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based

## **EVIDENCE GUIDE**

activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Samples*** may include grab, integrated or concentrated samples for:
- identification
  - enumeration
  - toxicity testing.
- Legislative and organisational requirements*** may include:
- Australian standards, for example AS/NZS 5667 Water quality - sampling
  - state Environment Protection Authority sampling guidelines
  - relevant federal and state or territory legislation and regulations
  - codes of practice, associated standards and guidance material
  - documented organisational policies, manuals and induction programs
  - relevant community planning and development agreements, such as land care agreements.
- Sampling equipment*** may include:
- buckets or wide-mouthed containers
  - depth samplers
  - sample dippers
  - hose pipe samplers
  - plankton nets
  - laboratory supplied sample containers
  - weighted sample bottles.
- Sample preservation methods*** may include:
- refrigeration
  - chemical addition, such as Lugol's iodine solution.
- Planning sampling work activities*** may include:
- interpreting instructions and directions
  - planning timelines
  - interacting and communicating with team members and individuals
  - considering customer service requirements.
- Sampling locations*** may include:
- water storages
  - rivers
  - wastewater lagoons.
- Records*** may include:
- sample records, field detail sheets or chain of custody

## **RANGE STATEMENT**

forms, including information such as:

- time sample was taken
- details of person collecting sample
- sample point
- volume of sample
- data gathered at time of collection
- preservation techniques.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment



## NWP300B Provide and promote customer service

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to respond effectively to the needs of internal and external customers by the application of the organisation's standards and processes. The ability to solve problems, communicate effectively and seek opportunities to improve service to customers are essential to performance.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required by all field staff and operators in addition to staff with specific responsibility for the provision of customer service to customers and suppliers of the organisation.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Apply organisational customer service standards.</b>	1.1 Check the organisation's <i>plans, policies and procedures</i> relating to customer service and apply them. 1.2 Explain the features, benefits and application of the organisation's products and services to customers. 1.3 Apply the organisation's <i>processes for handling customer queries, complaints and disputes</i> . 1.4 Apply <i>effective communication techniques</i> with different types of customers and situations. 1.5 Plan and participate in team and work activities to meet customer satisfaction and minimise inconvenience. 1.6 Use available resources to meet customer requirements and services.
<b>2 Respond to customer needs and concerns.</b>	2.1 Clarify customer needs and expectations. 2.2 Resolve customer concerns or complaints according to organisational policies and procedures. 2.3 Address customer needs or complaints clearly, politely and effectively. 2.4 Refer customer concerns related to organisational liability to appropriate persons or departments according to organisational policy. 2.5 Complete <i>documentation</i> and process it according to organisational and statutory requirements.
<b>3 Contribute to customer service standards.</b>	3.1 Identify and explain opportunities to improve services or processes to team members. 3.2 Review personal work performance to improve services to customers. 3.3 Record evidence of customer satisfaction and report to team members. 3.4 Contribute to the development, and improvement of quality service policies and standards.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively with customers, staff members (internal clients) and suppliers
- negotiate and resolve disputes or minimise the concerns of customers
- apply interpersonal skills
- communicate effectively in a diverse work force
- apply problem-solving skills
- apply dispute resolution skills
- report on customer issues
- apply customer relations policy and organisational standards
- identify both internal and external customers.

#### **Required knowledge:**

- relevant Acts and by-laws that impact customer service
- organisational policies, procedures, standards and quality systems
- problem-solving strategies
- communication techniques
- performance management systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to respond effectively to the needs of internal and external customers including:

- communicating effectively with internal and external customers according to organisational procedures and standards
- preparing resources and planning work to meet customer requirements
- managing and reporting customer complaints according to organisational procedures
- reviewing customer service and customer satisfaction
- contributing to improvements in customer service standards.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

## EVIDENCE GUIDE

experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Plans, policies and procedures*** may include:

- specific documents relating to customer service:
- service standards
- dispute resolution processes
- general organisational documentation:
- mission statements
- vision statements
- strategic and annual plans.

***Processes for handling customer queries, complaints and disputes*** may require:

- interaction and communication with other employees and other authorities including the appropriate referral of problems for resolution that are outside the scope of the officer's level of responsibility
- implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements
- access to appropriate records on hard copy or software systems.

***Effective communication techniques*** include:

- verbal or non-verbal language
- two-way interaction
- constructive feedback
- active listening
- questioning to clarify and confirm understanding
- interpreting non-verbal and verbal messages
- observation techniques
- use of positive, confident and co-operative language
- control of tone of voice and body language
- use of language and concepts appropriate to cultural differences
- use of clear presentations of options and consequences
- demonstrating flexibility and willingness to negotiate.

***Documentation*** that may be used or accessed includes:

- complaints handling forms
- work site records
- customer, interdepartmental or other organisation's correspondence.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Common



# NWP301B Implement, monitor and coordinate environmental procedures

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to identify and minimise the environmental impact of water industry work activities, identify general environmental risks and to implement, monitor and coordinate environmental procedures.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field workers and operational staff and staff with specific responsibility for demonstrating due diligence in conforming to environmental legislation and standards.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Assess the environmental requirements of a specific project or site.</b>	<p>1.1 Identify and investigate site-specific <b><i>environmental issues</i></b> with reference to relevant <b><i>environmental legislation and standards</i></b>.</p> <p>1.2 Assess and record <b><i>environmental risks and impacts</i></b>.</p> <p>1.3 Relate relevant environmental procedures for each environmental risk.</p>
<b>2 Implement environmental procedures.</b>	<p>2.1 Plan activities for the selected environmental procedures for the site and take relevant action.</p> <p>2.2 Report environmental incidents and apply and coordinate emergency procedures.</p> <p>2.3 Record environmental incidents according to organisational and statutory requirements.</p>
<b>3 Report and review the application of environmental procedures.</b>	<p>3.1 Monitor the effects of selected environmental controls and report according to organisational requirements.</p> <p>3.2 Complete environmental reporting procedures for the specific project or site.</p> <p>3.3 Report environmental risks, potential impacts and incidents according to organisational requirements.</p> <p>3.4 Contribute to regular reviews of environmental procedures.</p> <p>3.5 Contribute to improvements in environmental procedures.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- access, interpret and apply relevant legislative responsibilities
- communicate the application of environmental plans and procedures within the workplace
- monitor and coordinate environmental procedures
- access, interpret and apply relevant standard operating procedures
- interpret and apply environmental policies, plans and procedures
- apply control procedures to environmental risks and incidents
- assess environmental risks at the work site
- report and record environmental procedures.

#### **Required knowledge:**

- relevant legislative requirements and responsibilities
- organisational procedures
- standard operating procedures
- environmental management procedures
- control procedures for environmental risks and incidents
- the water cycle
- ecologically sustainable development
- heritage conservation
- primary agencies involved in drinking water quality management
- water quality performance indicators
- overview of the water supply system
- water hazardous agents and preventative strategies
- community and agency roles and responsibilities in monitoring water quality
- risk assessment procedures
- environmental impact assessment
- recording procedures
- reporting 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to:

- identify and investigate environmental issues
- assess and report environmental risks
- apply suitable environmental procedures as required
- manage and report environmental incidents
- monitor and review the effectiveness of environmental procedures
- contribute to the continuous improvement of environmental procedures
- complete relevant workplace documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Environmental issues*** may include:

- emissions to air
- releases to/of water
- releases to land
- vibration and noise
- disposal of waste
- contamination of land
- impact on communities
- destruction of habitat
- use of energy sources
- waste generation processes and technologies
- impact on culturally significant sites.

***Environmental legislation and standards*** may include:

- federal legislation
- state or territory legislation
- local government by-laws
- government and quasi government policies and regulations
- community planning and development agreements (for example, land care agreements)
- organisational policies and standards.

***Environmental risks and impacts*** may include:

- impact of mismanagement of chemicals
- impact of mismanagement of biological agents
- detrimental impact on limited water resources
- spillage
- waste disposal
- detrimental impact on water catchment areas (urban and non-urban)
- detrimental impact on rivers, waterways and channels
- unsatisfactory water and wastewater treatment processes
- unsatisfactory trade waste treatment and disposal processes
- poor construction processes
- planning deficiencies.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Common

## **NWP302A Install meters for non-potable, non-urban water supplies**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit covers the competency required to install water meters for non-potable water allocation in non-urban water systems.

### **Application of the Unit**

**Application of the unit** This unit of competency forms part of a skill set for meter installation and has application for the certification of water meter installers.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Confirm conditions of the site for meter installation.</b>	1.1 Identify the location of the site and establish <i>client information</i> .
	1.2 Identify access to the site and any <i>conditions of access</i> .
	1.3 Test the <i>conditions of the site</i> and analyse impact on installation assets.
	1.4 Complete an <i>environmental impact statement</i> for the site.
	1.5 Carry out a <i>job safety analysis</i> and identify hazards and control measures.
<b>2 Set out the site.</b>	2.1 Locate and install temporary benchmark.
	2.2 Store and secure material and equipment on site.
	2.3 Calculate and mark the site perimeters in relation to the flow of the channel.
	2.4 Ensure that excavations provide sufficient width for <i>movements of installation</i> .
<b>3 Install meter facilities.</b>	3.1 Install sumps and headwalls to ensure correct elevation, orientation and horizontal and vertical levels.
	3.2 Install pipes and meter pits to ensure the correct elevation, fall and orientation.
	3.3 Check pipe fittings and seals and eliminate flow disturbance.
	3.4 Install solar panels and display units according to manufacturers' requirements, check for operation and seal.
<b>4 Install meters.</b>	4.1 Install meters in meter pits according to manufacturers' requirements.
	4.2 Fit meters according to manufacturers' requirements.
	4.3 Align flanges, gaskets and internal pipe walls to eliminated flow disturbance and leaks.
	4.4 Locate and support meters to protect them from traffic and vibration.
<b>5 Restore site.</b>	5.1 Backfill upstream and downstream sumps with suitable material, moisture content and compaction to maximize compaction efficiency.
	5.2 Restore the site to closest to original site conditions.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- meter installation construction project planning
- calculation of head, flow and measurements of pipes and pressure
- undertake locational assessment and risk analysis for meter installation
- sample and test soil for backfill and installation structures
- analyse the impact of water infiltration on the stability of structures
- measure the head of water to judge sufficiency for meter's accuracy
- check power supply and links
- position solar panels to maximise power collection
- undertake a job safety analysis and checking hazards and safety requirements
- store and safe use of equipment on site
- determine excavation requirements
- calculate sump and headwall elevation and orientation
- calculate pipe and meter pit elevation, fall and presentation.
- install transducers and cabling safely
- interpret manufacturers' requirements for fitting meters in meter pits
- use techniques to protect meters from disturbance
- assess the effectiveness of backfill
- undertake site restoration.

#### Required knowledge:

- the purpose and standards for non-urban water metering.
- community expectations for water measurement and use
- standards for the installation of non-urban meters in open and closed conduit systems
- the social, environmental, economic and political responsibilities of water authorities in relation to meter installation
- requirements for checking the pattern approval of meters
- requirements for compliance with meter installation standards
- meter manufacturers guidelines and installation manual for specific meters
- the organisation's policies and procedures for water meter installation
- conditions for meter location and suitable installation assets and meters for the conditions
- causes of flow disturbance
- potential environmental causes of meter failure
- the organisation's environmental impact guidelines
- maintenance requirements for meter facility within and open channel
- relevant safety requirements including confined space.



## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to install meters for non-potable, non-urban water supplies including:

- identifying and analysing client requirements, site conditions and their impact on the types of meter required, and the design of the installation
- identifying and analysing environmental conditions and limitations and the impact of work to be undertaken
- identifying and analysing safety risks and hazards and responding to remove risks and hazards
- preparing sites and equipment for installation
- installing meter facilities using site specific requirements
- installing meters according to client and manufacturers' requirements and conditions
- identifying faults, changes and failure indicators
- restoring sites to original conditions.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

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assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning or examination to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

- Client information*** will include:
- landowner details
  - GPS coordinates
  - identification of the supply channel
  - running distance from validated point on the channel
  - discharge point.
- Conditions of access*** will include:
- suitability of existing access
  - landowner conditions
  - stock safety
  - vehicle and driver safety.
- Conditions of the site*** will include:
- soil sampling and testing
  - water infiltration
  - compaction of backfill
  - suitability of source head for accuracy
  - power supply
  - communication links.
- Environmental impact statement*** will include:
- water
  - air
  - soil
  - vegetation
  - fauna
  - cultural and heritage.
- Job safety analysis*** will include:
- personal protective equipment
  - safe access
  - confined space requirements
  - safe use of machinery and equipment
  - level of risk of hazards
  - adjustments to control hazards.
- Movements of installation*** will include:
- protect from collapse
  - correct depth
  - sufficient compaction.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution



# NWP303A Monitor and control maintenance of water and wastewater system assets

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to inspect and assess asset maintenance and repairs and to produce plans for and monitor and report on maintenance and repair work completion. The ability to identify faults, gather data, interpret technical information, assess risks and produce technical work plans, costings and reports are essential to performance.

This unit covers the competencies previously covered in: NWP334B, NWP335B, NWP336B and NWP337B.

## Application of the Unit

**Application of the unit** This unit covers a generic competency for field staff with responsibility for ensuring that water collection, distribution, storage and transfer assets are regularly monitored and conducting scheduled maintenance and repair work on assets.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Analyse asset condition and determine remedial action.</b>	1.1 Schedule routine inspections of <i>assets</i> and monitor fault reporting according to <i>organisational procedures</i> . 1.2 Collect and analyse data on asset and infrastructure condition according to organisational procedures. 1.3 Determine and cost asset maintenance and repair methods. 1.4 Correctly select <i>equipment</i> and fit and use required safety equipment, including personal protective equipment.
<b>2 Plan and prepare for asset repair.</b>	2.1 Schedule and plan work site investigations and repair activities according to organisational requirements. 2.2 Develop repair plans and procedures and communicate to all stakeholders. 2.3 Assess and record environmental and occupational health and safety risks according to enterprise requirements and specify appropriate preventative measures. 2.4 Select equipment, materials, prefabricated components and fittings and make available for use on site.
<b>3 Monitor and report maintenance activities.</b>	3.1 Monitor repairs to ensure compliance with organisational and statutory requirements. 3.2 Monitor repair and maintenance progress and keep records according to organisational procedures. 3.3 Inspect, confirm and report completion of repair and maintenance according to organisational procedures.
<b>4 Complete records and reports.</b>	4.1 Complete workplace records and reports according to organisational requirements. 4.2 Make recommendations which contribute to the continuous improvement and quality of the organisation's systems.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

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

#### **Required skills:**

- identify and correct operational problems
- undertake maintenance planning activities
- undertake calculations and determine work requirements
- monitor system operations and processes
- produce reports and logs
- use safety equipment and personal protective equipment
- interpret plans and instructions
- interpret the organisation's policies, standard operating procedures and standards for monitoring and maintenance of assets
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- calculate water pressures and flows
- identify and report control system faults.

#### **Required knowledge:**

- environmental aspects of water distribution systems and infrastructure
- organisational occupational health and safety procedures
- lock out procedures for mechanical and electrical installations
- cleaning and protection of assets
- policies and standard operating procedures for monitoring and maintenance of assets
- relevant utilities and service bodies
- communication systems
- environment, landscape and ground structure of work area
- risk factors and potential hazards involved with water pressures and flows
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of supply infrastructure
- system pipes and fittings
- pumping and valving systems
- system layout
- system processes
- system operation
- gravity systems
- control systems.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to inspect and assess asset maintenance and repairs and to produce plans for and monitor and report on maintenance and repair work completion including:

- conducting operational and maintenance inspections
- monitoring fault reports
- collecting and analysing operational and mechanical data
- identifying and assessing work methods effectiveness
- planning investigations and repairs
- developing repair procedures
- assessing risks and specifying preventive methods
- selecting equipment, materials, prefabricated components and fittings
- monitoring repairs
- inspecting completed repairs
- completing workplace records.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence require 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

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- 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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

*Assets* may include:

- infrastructure in urban or rural locations
- pumping stations
- filtration, treatment and related infrastructure
- service reservoirs
- channel and canal systems and related infrastructure
- pipes, including:
  - polyvinyl chloride (PVC)
  - polyethylene
  - mild steel cement lined
  - ductile iron cement lined
  - cast iron
  - copper
  - glass reinforced plastic
  - vitrified clay
  - reinforced concrete
  - asbestos cement
- structures, including:
  - meter pits
  - person access pits
  - regulators
  - erosion barriers
  - head walls
  - thrust blocks
  - drop structures
  - siphons
  - meter outlets
- prefabricated sections, including:
  - drainage sections
  - drainage pits
  - culverts
  - under road crossovers
- fittings, including:
  - jointing systems for pipe types eg gibault

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- tapping band
- tension bands
- solvent joins
- compression ring joints
- bolted flanges
- malleable jointing materials
- electrofusion
- butt welding
- cathodic protection
- irrigation systems
- drainage systems

*Organisational procedures* may include:

- organisational policies
- standard operating procedures
- environment protection
- occupational health and safety
- lifts and cranes
- mines
- road signage code
- electrical
- marine
- chemicals
- dangerous goods.

*Equipment* used may include:

- hand and power tools
- lifting and winching equipment
- mechanical excavation equipment
- levering equipment
- closed circuit television
- hydraulic and/or vacuum set-ups
- pneumatic and motorised equipment:
- pneumatic spades and attachments,
- pipes and associated fittings,
- motorised cutting equipment,
- on- and off-road vehicles,
- portable pumps
- compressors
- chemical spraying apparatus
- small marine craft
- trenching systems
- portable pumps
- communication equipment



## **RANGE STATEMENT**

- breathing apparatus
- gas detection equipment
- communication equipment
- rescue equipment
- appropriate personal protective equipment.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Asset management

# **NWP304A Maintain meters for non-potable, non-urban water supplies**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit describes the skills and knowledge required for the maintenance of water meters in open and closed conduit, for non-potable water allocation in non-urban water systems.

No licensing, regulatory or certification requirements apply to this unit at the time of endorsement.

## **Application of the Unit**

**Application of the unit** This unit covers the maintenance of the operational integrity of already installed meters, metering systems and their components. This unit covers corrective, predictive and preventative maintenance.

This unit does not cover replacement of the meter itself, or other significant components such as pipes, sumps and emplacements; capital works/asset replacement or tasks that use skills required for complex installations.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## Employability Skills Information

**Employability Skills** The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification or Skill Set in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Confirm meter type and location within asset management system.</b>	<p>1.1 Obtain organisational maintenance plan and manufacturers guidelines, where available.</p> <p>1.2 Locate meter <i>emplacement</i> on a map or by GPS or according to organisational procedures.</p> <p>1.3 Confirm that <i>meter type</i> matches maintenance plan or manufacturer's guidelines.</p> <p>1.4 Confirm that meter number matches maintenance plan.</p>
<b>2 Check condition of meters and metering system.</b>	<p>2.1 Identify <i>faults</i> using an <i>asset condition checklist</i>.</p> <p>2.2 Establish maintenance requirements.</p> <p>2.3 Check for hydraulic disturbances.</p> <p>2.4 Check condition of battery and charging system.</p> <p>2.5 Perform in situ test of meter as applicable.</p>
<b>3 Maintain meter and meter facilities.</b>	<p>3.1 <i>Rectify</i> faults in <i>components</i>, according to organisational guidelines.</p> <p>3.2 Identify faults which need to be rectified by a third party, according to organisational guidelines.</p>
<b>4 Test and recommission.</b>	<p>4.1 Ensure meter complies with standards.</p> <p>4.2 Perform in situ re-test of meter as applicable.</p> <p>4.3 Replace seals and tags.</p> <p>4.4 <i>Record faults</i> and meter performance, maintenance and repairs according to <i>organisational procedures</i> and <i>statutory requirements</i>.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- Reading and analysis of an electronic display
- Input of data into electronic controller
- Working with low voltage wiring
- Reading manufacturer's instructions, plans, exploded drawings, parts catalogues
- Reading verification marks
- Appropriate use of tags and seals.

#### **Required knowledge:**

- Organisational policies and procedures for water meter maintenance
- Organisational rights and responsibilities
- Manufacturers maintenance procedures for specific meter types
- Knowledge of checking pattern approval requirements (NMI)
- Standards for non-urban metering (ATS 4747)
- Manufacturers maintenance guidelines
- GPS
- Meter types and accuracy limits
- Head
- Water quality
- Flow rates
- Roles and responsibilities of maintenance personnel
- OHS guidelines
- Environmental, cultural and heritage guidelines.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

Evidence of the following is essential:

- confirms the site and the meter
- checks meter condition
- replaces components as required
- documents the maintenance.

#### **Context of and specific resources for assessment**

Assessment must ensure:

- access to a range of meters and installation sites
- access to organisational documentation
- observance of OHS guidelines.

A range of assessment methods should be used to assess knowledge. The following examples are appropriate for this unit:

- Written questions
- Oral questions on the job during the maintenance process
- Written Reports including Asset Condition Checklist, Meter Condition Report
- Third party reports from workplace supervisors.

A range of assessment methods should be used to assess skills. The following examples are appropriate for this unit:

- Demonstrations of meter maintenance in a workplace environment
- Written Reports including Asset Condition Checklist, Meter Condition Report
- Third party reports from workplace supervisors.

Assessment should be based on evidence which has been gathered from a number of meter installations in a range of conditions which reflect a predictable variety of routine requirements and the range of variables, as well as which allow the potential for applying knowledge and skills in some conditions which require problem solving and contingency responses.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or

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assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Emplacement*** may include:
- Sumps, pipes, civil structures
  - Pits, concrete structures.
- Meter type*** may include:
- Electromagnetic
  - Ultrasonic (Doppler, transit time)
  - Mechanical meters (propeller actuated, turbine)
  - Systems of automated or manually operated weirs and gates with flow measurement capability
  - Open channel flumes and thin-plate weirs
  - Channel or stream gauging emplacements.
- Faults*** may include:
- Weeds and other obstructing materials
  - Dirty solar panels
  - Blockages and leakages of pipes and channels
  - Leaking/seeping channel banks
  - Animal infestations (wasp nests, ants and spider webs, bird nests, yabbies)
  - Electrical interference
  - Distortion of pipes
  - Flow disturbance factors.
- Asset condition checklist*** may include:
- Visual clues - leaks, breaks, seals, vandalism or tampering, wiring, tags and verification marks
  - Validated third-party reports
  - Display outputs - fault codes
  - Erratic or inconsistent data readings
  - Water quality, water flow (flow rate and full pipe)
  - Operating parameters of the emplacement & meter (eg full flowing or partially full; operating range with respect to flows)
  - Electrical interference
  - Check of security seals.
- Rectify*** may include:
- Unblocking/ desilting
  - Ensuring flanges etc are tight
  - Replacing components according to organisational guidelines.



## **RANGE STATEMENT**

*Components* may include:

- Sensors
- Chips
- Cogs
- Spindles
- Transducers
- Outputs
- Probes
- Connectors
- Wiring
- Seals & guides (doors & valves)
- Actuation system
- Chargers & batteries.

*Record faults* may include:

- Asset Condition Checklist
- Meter Condition Report.

*Organisational procedures and statutory requirements* may include:

- Maintenance Plan
- Manufacturers Guidelines
- Australian Technical Standards.

## **Unit Sector(s)**

Not applicable.

## **NWP305B Monitor and conduct minor maintenance on complex flow control and metering devices**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor the operation of complex flow control, measuring and regulating devices controlling water supply in ground and/or surface water source systems, or water supply and/or distribution systems, wastewater collection and transfer systems. This competency also covers minor maintenance responsibilities.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with a specific responsibility for monitoring the operation of complex flow control, measuring and regulating devices, conducting minor maintenance and ensuring that problems and anomalies are rectified by specialist technicians in a timely manner.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1Plan and prepare for work.</b>	<p>1.1 Interpret work requirements for <b><i>monitoring complex flow control and metering devices</i></b> from plans, drawing specifications and instructions.</p> <p>1.2 Select and check <b><i>equipment and tools</i></b> to meet the safety requirements of the task and site.</p> <p>1.3 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2Monitor device and equipment performance.</b>	<p>2.1 Identify devices and equipment and interpret specifications for operation.</p> <p>2.2 Check information on devices and equipment performance and report according to <b><i>organisational and statutory requirements</i></b>.</p>
<b>3Conduct minor maintenance on devices and equipment.</b>	<p>3.1 Undertake routine maintenance tasks for complex devices according manufacturer's specifications and organisational requirements.</p> <p>3.2 Secure devices and equipment according to organisational requirements.</p> <p>3.3 Identify and report <b><i>problems and anomalies</i></b> immediately to appropriate personnel for correction.</p>
<b>4Monitor system performance.</b>	<p>4.1 Schedule and monitor <b><i>routine inspections</i></b> of system and networks according to organisational procedures.</p> <p>4.2 Collect, analyse and report data on system performance and usage according to organisational requirements.</p> <p>4.3 Take samples according to organisational requirements.</p>
<b>5Compile process records and reports.</b>	<p>5.1 Report information relating to system demand adjustment requirements according to organisational requirements.</p> <p>5.2 Identify process faults and the operational condition of the system and network and report according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and report operational problems
- collect and report system performance information
- inspect flow regulation, measuring and regulating devices
- produce reports and logs
- use communication systems
- give and receive instructions
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with customers and other employees
- use personal protective equipment.

#### **Required knowledge:**

- monitoring flow control, measuring and regulating devices' performance
- system hydraulics
- system layout
- relevant utilities and service bodies
- communication systems
- materials handling
- environmental, landscape and ground structure of water distribution and/or wastewater collection systems
- system and network risk factors and potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of system and site
- flow measurement procedures
- data collection and recording
- system flow control mechanisms and control systems
- where relevant, lock out procedures for mechanical and electrical installations.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor the operation of complex flow control, measuring and regulating devices including:

- interpreting work requirements and selecting appropriate equipment and tools, including personal protective equipment
- identifying devices and equipment to be monitored and relevant operational specifications
- collecting and recording information on device performance
- conducting minor routine maintenance tasks and secure devices
- identifying and reporting problems and anomalies
- inspecting system and networks
- collecting and recording data on system performance
- taking samples
- reporting monitoring and inspecting findings
- identifying and reporting on system performance.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

of performances assessed at different points in time and separated by further learning and practice

- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Monitoring complex flow control and metering devices*** may include:

- SCADA
- checking pressures at PSVs
- checking the status of valves and sensors.

***Equipment and tools*** may include:

- electronic digital monitoring and metering systems (telemetry) and system adjustments
- basic hand and power tools
- manual chart recording systems
- communication equipment
- lifting and winching equipment
- on- and off-road vehicles
- atmosphere monitor
- safety and rescue equipment.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- occupational health and safety
- marine
- Water Acts
- flood operation procedures
- emergency and incident management plans
- World Health Organisation standards
- Australian Drinking Water Guidelines
- Mines Act.

***Routine inspections*** may include:

- interaction and communication with other employees, other authorities and the general public
- visual observation
- implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies, standard operating procedures and statutory requirements.

Reporting of ***problems and anomalies*** may include:

- location of faults, such as:
- sensor
- signal
- power supply

## **RANGE STATEMENT**

- actuator
- valve
- sensor
- contacting designated specialist.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution



# NWP308B Test and commission wastewater collection systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to plan and implement the testing and commissioning of wastewater collection systems. The ability to interpret technical information, identify and assess hazards and perform technical testing procedures are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff and operators with specific responsibility for commissioning wastewater collection systems, post-installation or repair, ensuring that the functioning of the system complies with relevant specifications and organisational requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for testing and commissioning.</b>	1.1 Identify and interpret the <b><i>system operation requirements</i></b> correctly. 1.2 Confirm testing and commissioning tasks from <b><i>relevant documentation</i></b> and scheduled appropriately. 1.3 Identify and assess <b><i>potential hazards</i></b> and take required preventative measures. 1.4 Select and use <b><i>tools and equipment</i></b> correctly. 1.5 Check testing equipment for accuracy and correct malfunctions.
<b>2 Conduct pipeline and access structure testing procedures.</b>	2.1 Select and install tensioning and measuring equipment correctly. 2.2 Select and fit gauges of the correct range to test equipment. 2.3 Carry out <b><i>testing procedures</i></b> according to <b><i>organisational and statutory requirements</i></b> . 2.4 Locate failed pipes, joints and fittings accurately and reschedule reporting and testing. 2.5 Accurately locate and report failed maintenance holes, inspection shafts, maintenance shafts or other access structures and rescheduled testing.
<b>3 Commission the wastewater collection system.</b>	3.1 Ensure the system is operational according to specifications and organisational procedures. 3.2 Restore the work site to meet environmental and organisational requirements. 3.3 Check, maintain and store equipment tools and materials according to manufacturer guidelines and organisational procedures.
<b>4 Review, record and report results.</b>	4.1 Maintain workplace records according to organisational and statutory requirements. 4.2 Maintain calibration records and certificates in accordance with organisational and statutory requirements

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required Skills**

- communicates effectively and appropriately with colleagues and contractors
- communicates the implementation of OHS policies and procedures
- interprets and applies a range of technical documents including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - organisational policies
- conducts test procedures
- identifies system faults
- uses test equipment
- monitors work processes and ensures safe work practices
- identifies reports and records hazards and risks
- uses personal protective equipment
- participates in ensuring compliance with standards, regulations and policies
- maintains and checks records and documents.

#### **Required knowledge:**

- general occupational health and safety on work sites
- the risk factors and potential hazards of test procedures
- characteristics of pipes, materials and fittings
- an overview of wastewater system and water industry operations
- layout and construction of wastewater collection systems
- testing procedures for wastewater systems
- relevant definitions, terminology, symbols and language.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to plan and implement the testing and commissioning of wastewater collection systems including:

- interpreting the testing requirements of the system from relevant plans and documentation
- preparing and checking testing equipment
- assessing risks and hazards and taking appropriate preventive measures
- using testing equipment correctly
- applying testing procedures accurately
- identifying and reporting faulty system components
- making the system operational and conducting post-commissioning checks
- restoring the worksite
- completing relevant documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

practice

- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- System operation requirements*** may include:
- calibration certificates
  - NATA certifications.
- Relevant documentation*** may include:
- manufacturer's specifications
  - organisational procedures.
- Potential hazards*** may include:
- work in confined spaces
  - work involving lifting and moving materials
  - working in a trench
  - health hazards associated with working in wastewater collections systems.
- Tools and equipment*** may include:
- hand and power tools
  - lifting and winching equipment
  - testing equipment
  - communication equipment
  - line plugs
  - gauges
  - personal protective equipment.
- Testing procedures*** may include:
- hydrostatic test
  - vacuum test
  - low pressure air test.
- Organisational and statutory requirements*** may include:
- by-laws
  - organisational policies
  - standard operating procedures
  - environmental protection
  - occupational health and safety guidelines for:
    - lifts and cranes
    - mines
    - road signage code
    - electrical
    - dangerous goods.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP309B Test and commission water distribution systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to plan and implement the testing and commissioning of water distribution systems. The ability to interpret technical information, identify and assess hazards and perform technical testing procedures are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff and operators with specific responsibility for commissioning water distribution systems, post-installation or repair, ensuring that the functioning of the system complies with relevant specifications and organisational requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for testing and commissioning.</b>	<p>1.1 Check plans for the section to be tested and locate features on site.</p> <p>1.2 Correctly identify and interpret the <i>system operation requirements</i>.</p> <p>1.3 Check vacuum testing and commissioning tasks from <i>relevant documentation</i> and schedule appropriately.</p> <p>1.4 Identify and assess <i>potential hazards</i> and take required preventative measures.</p> <p>1.5 Select and use <i>tools and equipment</i> correctly.</p> <p>1.6 Check testing equipment for accuracy and identify and correct malfunctions.</p>
<b>2 Maintain water system hygiene.</b>	<p>2.1 Arrange disinfection according to <i>organisational and statutory requirements</i>.</p> <p>2.2 Flush and/or slug clean or swab the relevant section of the distribution system according to the required standard using approved techniques.</p> <p>2.3 Dispose of flushing according to organisational requirements.</p>
<b>3 Test the pipeline system.</b>	<p>3.1 Fill the distribution system slowly and flush systematically to expel air and debris.</p> <p>3.2 Determine the correct test pressure for the pipeline and fit gauges of the correct range to test equipment.</p> <p>3.3 Carry out testing procedures according to specifications and organisational requirements.</p> <p>3.4 Accurately locate and report failed pipes, joints and fittings and reschedule testing.</p> <p>3.5 Vacuum test concrete access chambers using standard techniques.</p>
<b>4 Commission the distribution system.</b>	<p>4.1 Ensure the distribution system is made operational according to specifications and organisational procedures.</p> <p>4.2 Check, maintain and store equipment, tools and materials according to manufacturer's guidelines and organisational procedures.</p> <p>4.3 Restore the work site to meet environmental and organisational requirements.</p>
<b>5 Review record and report results.</b>	<p>5.1 Maintain workplace records according to organisational and statutory requirements.</p> <p>5.2 Maintain calibration records and certificates according to organisational and statutory requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively and appropriately with colleagues and contractors
- communicate the implementation of OHS policies and procedures
- interpret and apply a range of technical documents including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - plans
  - instructions
  - standard operating procedures
  - organisational policies
- conduct test procedures
- use test equipment
- monitor work processes and ensure safe work practices
- identify reports and record hazards and risks
- give and receive instructions
- test pipes
- identify system faults
- use personal protective equipment.

#### **Required knowledge:**

- general occupational health and safety on work sites
- the risk factors and potential hazards of test procedures
- water hygiene and system disinfection requirements
- equipment operation
- environmental aspects of test procedures
- characteristics of pipes, materials and fittings
- an overview of the water distribution system and water industry operations
- relevant definitions, terminology, symbols and language
- testing methods used for water distribution systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to test and commission water distribution systems including:

- planning the testing of water distribution systems
- identifying and analysing system requirements
- identifying and addressing hazards
- using suitable equipment
- maintaining the quality of water in the system
- commissioning the distribution system
- restoring worksite and equipment
- completing required reports and records.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- |  |   |
|--|---|
| <b><i>System operation requirements</i></b> may include:             | <ul style="list-style-type: none"> <li>• calibration certificates</li> <li>• NATA certification.</li> </ul>   |
| <b><i>Relevant documentation</i></b> may include:                    | <ul style="list-style-type: none"> <li>• manufacturer's specifications</li> <li>• organisational procedures.</li> </ul>   |
| <b><i>Potential hazards</i></b> may include:                         | <ul style="list-style-type: none"> <li>• work in confined spaces</li> <li>• work involving lifting and moving materials</li> <li>• working in a trench.</li> </ul>  |
| <b><i>Tools and equipment</i></b> may include:                       | <ul style="list-style-type: none"> <li>• hand and power tools</li> <li>• lifting and winching equipment</li> <li>• testing equipment</li> <li>• communication equipment</li> <li>• line plugs</li> <li>• gauges</li> <li>• personal protective equipment.</li> </ul>  |
| <b><i>Organisational and statutory requirements</i></b> may include: | <ul style="list-style-type: none"> <li>• by-laws and organisational policies</li> <li>• standard operating procedures</li> <li>• environment standards</li> <li>• occupational health and safety</li> <li>• lifts and cranes</li> <li>• mines</li> <li>• road signage code</li> <li>• electrical</li> <li>• dangerous goods.</li> </ul> |

## Unit Sector(s)

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP310B Monitor and operate water distribution systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and coordinate the operation of bulkwater or water distribution systems and to measure and report on the operation of the system. The ability to interpret technical documentation, identify and investigate operational problems and to collect and analyse technical information are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff and operators with a specific responsibility for inspecting and measuring the performance of bulkwater or water distribution systems and for ensuring that flow, pressure and volume parameters are regulated according to organisational specifications and system demands

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor system performance and usage.</b>	<p>1.1 Select and check <b><i>equipment</i></b> required for monitoring system performance.</p> <p>1.2 Schedule and conduct routine inspections and report any identified <b><i>faults</i></b> according to <b><i>organisational procedures and statutory requirements</i></b>.</p> <p>1.3 Collect, analyse and report system performance data according to organisational requirements.</p> <p>1.4 Monitor sample collection and records according to organisational procedures.</p>
<b>2 Regulate flow, pressure and volume.</b>	<p>2.1 Inspect <b><i>flow regulating systems</i></b> and determine and apply adjustments required to meet demand.</p> <p>2.2 Monitor pressures and volumes and determine and apply the adjustments required to meet system demands.</p> <p>2.3 Monitor flows and determine and apply the diversions required to facilitate repair or emergency activities.</p>
<b>3 Operate and control distribution processes.</b>	<p>3.1 Control <b><i>distribution processes</i></b> to maintain the required parameters of operation.</p> <p>3.2 Conduct flow measurements according to organisational procedures.</p> <p>3.3 Identify and address <b><i>process faults</i></b> and operational conditions and report according to organisational requirements.</p> <p>3.4 Optimise process performance according to organisational requirements.</p>
<b>4 Compile process reports.</b>	<p>4.1 Compile reports from system data to meet organisational requirements.</p> <p>4.2 Record the condition of equipment and report faults or anticipated problems according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively and appropriately with colleagues and contractors
- respond to and correct operational problems
- produce reports, logs etc
- use safety equipment and personal protective equipment
- identify and investigate operational problems
- collect and analyse data
- interpret plans, charts, service search diagrams, instructions and specifications
- interpret policies, standard operating procedures and standards
- communicate with employees and customers
- use communication systems
- give and receive instructions
- control system operations
- identify control system faults.

#### **Required knowledge:**

- system hydraulics
- coordination and control of processes
- system layout
- system processes
- environmental aspects of bulkwater and water distribution systems
- chemical use
- safety procedures
- lock out procedures for mechanical and electrical installations
- policies, standard operating procedures and legislation
- relevant utilities and service bodies
- communication systems
- risk management principles
- risk factors and potential hazards involved with water pressures and flows
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of bulkwater and water distribution systems
- types of pipes and fittings
- pumping and valving systems
- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate will provide evidence of monitoring and coordinating the operation of bulkwater or water distribution systems:

- Interpreting a range of technical documentation,
- identifying and investigating operational problems
- collecting and analysing technical information
- conducting routine inspections
- analysing and reporting system performance data
- meeting organisation standards for optimising water distribution performance.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Equipment*** used may include:

- electronic monitoring, telemetry and metering systems
- manual chart recording systems
- on- and off-road vehicles
- testing and sampling equipment
- communication equipment
- personal protective equipment
- atmosphere monitoring equipment
- breathing apparatus
- rescue equipment
- appropriate personal protective equipment
- pumping systems
- valving systems
- communication equipment
- computerised equipment.

***Faults*** may include:

- illegal usage
- water quality
- low pressure
- flow.

***Organisational procedures and statutory requirements*** may include:

- occupational health and safety procedures, including use of personal protective equipment
- by-laws and organisational policies
- standard operating procedures
- environment protection
- hazardous substances
- equal employment opportunity
- occupational health and safety
- relevant Australian Standards
- manufacturer's standards and specifications
- World Health Organisation standards
- Australian Drinking Water Guidelines.

***Flow regulation systems*** may include:

- pumping systems
- valving systems
- gravity flow systems
- service reservoirs

## **RANGE STATEMENT**

*Monitoring and coordination* may require:

- electronic and manual control systems.
- interaction and communication with other employees, other authorities and the general public
- visual observation
- implementation of reporting procedures that may also include lock out for electrical and mechanical installations and procedures for the implementation of by-laws, organisational policies, standard operating procedures and statutory requirements.

*Distribution processes* may include:

- monitoring of system demands
- monitoring pressure
- attending to and recording water supply problems such as low pressure and water quality.

*Process faults* may include:

- pressure leakage
- main breaks
- contamination
- odour
- discolouration.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# **NWP311B Monitor and operate wastewater collection and transfer systems**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor and coordinate the operation of wastewater collection and/or wastewater transfer systems and to measure and report on the operation of the system. The ability to interpret technical documentation, identify and investigate operational problems and to collect and analyse technical information are essential to performance.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff and operators with a specific responsibility for inspecting and measuring the performance of wastewater collection and/or wastewater transfer systems and for ensuring that flows are regulated according to organisational specifications and system demands.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

### **Elements and Performance Criteria Pre-Content**

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor system performance and usage.</b>	<p>1.1 Select and check <i>equipment</i> required for monitoring system performance.</p> <p>1.2 Schedule and conduct routine inspections and report <i>faults</i> according to <i>organisational procedures and statutory requirements</i></p> <p>1.3 Collect, analyse and report system performance and usage data according to organisational requirements.</p> <p>1.4 <i>Monitor and coordinate</i> sample collection and records according to organisational procedures.</p>
<b>2 Regulate flows.</b>	<p>2.1 Inspect and adjust <i>flow regulating systems</i> according to organisational procedures.</p> <p>2.2 Monitor volumes and make adjustments to meet system requirements.</p> <p>2.3 Monitor flows and diversions required for repair or emergency activities.</p>
<b>3 Operate and control processes.</b>	<p>3.1 Control and improve <i>processes</i> to maintain operating parameters.</p> <p>3.2 Carry out wastewater flow measurements according to organisational procedures.</p> <p>3.3 Identify, address and report <i>process faults</i> according to organisational and statutory requirements.</p> <p>3.4 Optimise process performance according to organisational and statutory requirements.</p>
<b>4 Compile process records.</b>	<p>4.1 Compile reports from system data to meet organisational and statutory requirements.</p> <p>4.2 Record the condition of equipment and report faults or anticipated problems according to organisational and statutory requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively and appropriately with colleagues and contractors
- respond to and correct operational problems
- produce reports and logs
- use safety equipment and personal protective equipment
- identify and investigate operational problems
- collect and analyse data
- interpret plans, charts, service search diagrams and instructions and specifications
- interpret policies, standard operating procedures and standards
- communicate with employees and customers
- use communication systems
- give and receive instructions
- control system operations
- identify control system faults.

#### **Required knowledge:**

- system hydraulics
- coordination and control of processes
- system layout
- system processes
- environmental aspects of wastewater collection and transfer systems
- infiltration and inflow sources
- illegal inflows
- discharges
- disinfection and chemical use
- safety procedures
- lock out procedures for mechanical and electrical installations
- policies, standard operating procedures and legislation
- relevant utilities and service bodies
- communication systems
- risk factors and potential hazards involved with wastewater pressures and flows
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of collection and transfer systems
- pipes and fittings
- gravity systems
- pumping and valving systems
- control systems.



## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor and coordinate the operation of wastewater collection and/or wastewater transfer systems including:

- preparing equipment for monitoring and inspections
- monitoring the system and collecting, analysing and reporting data according to organisational procedures
- reviewing samples and records
- adjusting flow regulating systems
- monitoring volumes and flows
- controlling, integrating and optimising processes
- identifying and reporting process faults
- measuring wastewater flows
- completing relevant workplace documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Equipment*** used may include:

- electronic monitoring, telemetry and metering systems
- manual chart recording systems
- on- and off-road vehicles
- disinfection equipment
- testing and sampling equipment
- communication equipment
- personal protective equipment
- atmosphere monitoring equipment
- breathing apparatus
- rescue equipment
- pumping systems
- valving systems
- gravity systems
- computerised equipment.

***Faults*** may involve:

- illegal inflows
- discharges
- odours
- surcharges.

***Organisational procedures and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- hazardous substances
- occupational health and safety, including the use of personal protective equipment
- relevant Australian Standards
- manufacturer's standards and specifications
- World Health Organisation guidelines.

***Monitor and coordinate*** may require:

- interaction and communication with other employees, other authorities and the general public
- visual observation
- implementation of reporting procedures that may also include lock out for electrical and mechanical installations and procedures for the implementation of by-laws, organisational policies, standard operating procedures and

## RANGE STATEMENT

- Adjustment of *flow regulating systems* may require:
- statutory requirements.
  - the adjustment of pumping systems
  - valving systems
  - gravity flow systems
  - service reservoirs
  - electronic and manual control systems.
- Processes* may include:
- monitoring infiltration and exfiltration of wastewater collections systems
  - monitoring volume of transfer systems
  - attending to and recording problems such as odour or discharge.
- Process faults* may include:
- grit drop out in pipe work
  - exfiltration tracking/ CCTV survey records
  - infiltration tracking/ smoke testing/ CCTV survey records
  - emergency release.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# **NWP315B Investigate and report on breaches of water industry legislation**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to investigate breaches of legislation relevant to the water industry, including conducting interviews and preparing reports for use in court proceedings.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for enforcing Water Industry legislation, including local by-laws and the Water Act.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Investigate breach of legislation.</b>	1.1 Identify and investigate <b><i>breaches of legislation.</i></b> 1.2 Collect and collate information about breach of legislation according to organisational requirements.
<b>2 Notify breaches to relevant parties.</b>	2.1 Issue notification of breach of legislation to subjects according to organisational procedures. 2.2 Interview subjects and recommend <b><i>remedial action</i></b> or <b><i>further action</i></b> according to organisational procedures. 2.3 Collate interview notes and information.
<b>3 Prepare reports and records.</b>	3.1 Prepare clear and concise reports for use in court proceedings according to stakeholders' and organisational requirements. 3.2 Recommend action according to design specifications and organisational requirements.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve and manage problems
- produce concise reports and logs
- represent and perform duties professionally
- provide solutions and make decisions
- use photographic and video cameras
- use safety equipment and personal protective equipment
- identify and investigate the source of infiltration and inflows
- investigate illegal inflows and discharges
- interpret plans, service diagrams, charts and specifications
- interpret policies and standard operating procedures
- communicate with employees and customers
- manage processes
- use communication equipment
- give and receive instructions
- monitor inflows
- identify control system faults.

#### **Required knowledge:**

- investigation processes
- court protocols
- relevant by-laws
- system processes
- systems operation
- isolation procedures
- environmental aspects of systems and infrastructure
- infiltration and inflow sources
- illegal inflows and discharges
- illegal diversions
- risk management principles
- rehabilitation and remedial processes
- safety procedures
- policies, standard operating procedures and legislation
- relevant utilities and service bodies
- communication systems
- risk factors and potential hazards involved in systems
- equipment operation, capacity and limitations

## **REQUIRED SKILLS AND KNOWLEDGE**

- effects of weather and conditions on infrastructure
- pipes and fittings
- pumping and valving systems
- gravity systems
- control systems.

## **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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to investigate and report on breaches of legislation relevant to the water industry, including:

- investigating of breaches of specific legislation as specified by the organisation
- identifying and reporting faults
- issuing correct notification of the breach to the offender
- conducting interviews with offenders and taking notes
- reporting all evidence to appropriate organisational personnel with recommendations for action.

## Range Statement

### 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. Add any 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.

***Breach of legislation*** may include:

- breach of water restrictions
- illegal connections
- disposal of wastewater in excess of licensed amount
- disposal of non-treated wastewater
- exceeding pumping license.

***Remedial action*** may include:

- issue of prohibition notice
- issue of improvement notice
- issue of suggested action
- contact trade waste officers.

***Further action*** may include:

- on-the-spot fines
- issue of 'show cause' notice
- issue of contact officer details.

***Recording and reporting*** may be completed:

- manually
- electronically.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Common

## **NWP316B Monitor and schedule water deliveries**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to schedule water deliveries for irrigation and/or domestic and stock supply systems, including monitoring flows, analysing data, coordinating hydraulic processes and compiling operational reports.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff and operators with a specific responsibility for ensuring that water deliveries meet varying customer requirements.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Schedule water deliveries.</b>	<p>1.1 Identify and record customer water orders.</p> <p>1.2 Analyse water orders to determine water delivery and flow rate requirements.</p> <p>1.3 <b><i>Schedule water deliveries</i></b> to meet flow rate requirements and organisational standards for channel balance and capacity restraints.</p>
<b>2 Monitor water delivery.</b>	<p>2.1 Monitor channel flow rate, regulation and delivery according to customer requirements.</p> <p>2.2 Maintain delivery performance records according to organisational requirements.</p> <p>2.3 Analyse system performance using system data and records to determine actual and planned performance.</p>
<b>3 Coordinate and control water delivery.</b>	<p>3.1 Calculate system adjustments according to demand and organisational requirements.</p> <p>3.2 Coordinate flow regulation, channel levels, security of flow devices and settings according to demand and organisational requirements.</p>
<b>4 Compile reports and records of water delivery.</b>	<p>4.1 Compile reports from system performance data according to organisational requirements.</p> <p>4.2 Maintain appropriate measurements and delivery records according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identifies and responds to operational problems
- produces basic reports and logs
- operates communications equipment
- gives and receives instructions
- follows plans, charts and instructions
- uses safety equipment and personal protective equipment
- communicates with customers and other employees
- works effectively as part of a team
- performs work related calculations
- operates irrigation and/or domestic stock supply system
- checks channel flow
- identifies control system faults.

#### **Required knowledge:**

- system hydraulics
- impact of the principles of hydraulics on the operation of flows
- coordination processes
- principles of scheduling
- system layout
- system operations
- policies and standard operating procedures
- communication systems
- lock out procedures for mechanical and electrical installations
- environmental aspects of irrigation and/or stock and domestic supply system asset infrastructure
- safety procedures
- environment, landscape and ground structure of work area
- risk factors and potential hazards of irrigation and/or domestic and stock supply systems
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site plant
- water flow calculations
- flow measurement procedures
- gravity systems
- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to schedule water deliveries for irrigation and/or domestic and stock supply systems including:

- analysing volumes and flow rates required for water deliveries
- preparing schedules for water deliveries from customer orders
- monitoring and regulating system performance
- adjusting system according to demand
- coordinating flow regulating devices
- completing relevant documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect



## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Schedule water deliveries*** may include:

- interaction and communication with:
- team members
- other authorities
- the general public
- implementation of reporting procedures that may also include:
- procedures for the implementation of by-laws
- organisational policies
- standard operating procedures
- statutory requirements.

### Unit Sector(s)

Not applicable.

### Competency field

**Competency field**      Collection and distribution

# NWP317B Control water quality in distribution systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor, identify and resolve water quality problems in water distribution systems. The ability to identify and investigate operational problems, collect samples and analyse technical information, communicate effectively with stakeholders and to interpret and apply incident management procedures are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with a specific responsibility for monitoring water quality and responding to issues affecting water quality in distribution systems.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Identify and locate water quality problems.</b>	<p>1.1 Conduct <b><i>monitoring of water quality</i></b> according to <b><i>organisational and statutory requirements</i></b>.</p> <p>1.2 Investigate <b><i>water quality problems</i></b> and identify the cause according to organisational requirements.</p> <p>1.3 Collect, analyse and report <b><i>system data</i></b> according to organisational requirements.</p> <p>1.4 Collect, label and record samples according to organisational requirements.</p> <p>1.5 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Respond to water quality problems.</b>	<p>2.1 Analyse incidents and apply <b><i>incident management procedures</i></b> to resolve water quality problems.</p> <p>2.2 Notify <b><i>stakeholders</i></b> of policies, procedures and plans.</p> <p>2.3 Monitor the recovery of the system and measure recovery according to organisational requirements.</p> <p>2.4 Investigate and review results and take action according to organisational requirements.</p>
<b>3 Complete documentation.</b>	<p>3.1 Report process faults according to organisational requirements.</p> <p>3.2 Compile reports from system data according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct operational problems
- identify and investigate water quality problems
- access, interpret and apply relevant organizational and legislative requirements
- identifies environmental policies, plans and procedures
- undertake sampling and testing procedures
- produce reports, logs, etc.
- use safety equipment and personal protective equipment
- investigate type of contamination
- interpret plans, service diagrams, topographic plans, charts and specifications
- interpret policies, standard operating procedures
- communicate with employees and customers
- manage system operations and processes
- use communication systems
- give and receive instructions
- monitor inflows
- identify control system faults.

#### **Required knowledge:**

- relevant legislative requirements and responsibilities
- established environmental management procedures
- control procedures for environmental risks and incidents
- environmental impact assessment
- primary agencies involved in drinking water quality management
- water quality standards and issues
- causes of water quality deterioration
- system hydraulics
- incident management processes
- system layout
- system processes
- systems operation
- isolation procedures
- sampling and testing procedures
- water quality specifications
- environmental aspects of water systems and infrastructure
- safety procedures
- lock out procedures for mechanical and electrical installations

## **REQUIRED SKILLS AND KNOWLEDGE**

- policies, standard operating procedures and legislation
- relevant utilities and service bodies
- communication systems
- environment, landscape and ground structure of work area
- risk management principles
- risk factors and potential hazards involved in water systems
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of infrastructure
- pipes and fittings
- pumping and valving systems
- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should:

- perform each task outlined in the elements consistently and in a representative range of contexts
- meet the performance criteria associated with each element by employing the techniques, procedures, information and resources available in the workplace from those listed in the range statement
- demonstrate an understanding of the underpinning knowledge and the application of skills as described under knowledge and skills.

The candidate should demonstrate the ability to:

- monitor characteristics of water quality
- investigate water quality problems
- collect samples
- collect and record water quality data
- analyse and resolve water quality incidents
- inform stakeholders regarding water quality procedures and incident management plans
- complete incident reports and other relevant documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- 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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Monitoring*** may require:

- visual and electronic inspection
- the implementation of incident management plans and reporting procedures
- the implementation of by-laws, organisational policies, standard operating procedures and statutory requirements.

***Organisational and statutory requirements*** may include:

- Australian Drinking Water Guidelines
- National Water Quality Management Strategy
- World Health Organisation guidelines
- local authority by-laws
- organisational policies and standard operating procedures
- environment protection
- equal employment opportunity
- occupational health and safety, including the use of personal protective equipment
- plumbing and drainage standards
- Water Acts
- electrical and mechanical procedures
- hazardous substances and dangerous goods.

***Water quality*** includes:

- parameters and standards as set by:
- the World Health Organisation
- the National Health and Medical Research Council (NHMRC):
- Australian Drinking Water Guidelines

***Water quality problems*** may include:

- loss of disinfection
- E. coli
- cross contamination
- levels of heavy metals, such as manganese and iron
- turbidity (nephelometric turbidity units -NTU)
- colour (Hazen units - HU)
- odour and presence of trihalomethanes (THMs).

***System data*** may include:

- sampling and testing records
- infrastructure failures
- customer complaints.

## **RANGE STATEMENT**

- Investigation*** may require:
- the identification of possible contamination in areas including:
    - catchment areas,
    - bulkwater assets,
    - water transfer assets
    - water distribution assets
    - sampling procedures
    - interaction and communication with other employees, other authorities and the general public.
- Incident management procedures*** may include:
- categorisation of the incident
  - implementation of the incident management control plan
  - customer notification
  - notification to relevant state or territory government departments.
- Stakeholders*** may include:
- consumers
  - employee groups
  - community groups
  - government departments.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP318A Monitor and operate gated spillways

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to manage and conduct surveillance of catchment run-off through dams and other water storage assets with gated spillways for dam/storage operations and flood routing.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with a specific responsibility for the operation of dams and other water storage assets with gated spillways.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor flow and flood routing.</b>	<p>1.1 Monitor catchment behaviour during normal and flood conditions according to organisational procedures and practices.</p> <p>1.2 Determine outflow using standard flow rate calculations.</p> <p>1.3 Determine flow control settings.</p>
<b>2 Plan and prepare for dam or storage operation.</b>	<p>2.1 Correctly apply <b><i>guidelines and regulatory requirements for dam or water storage operation</i></b> to operation plans.</p> <p>2.2 Apply relevant organisational policies, standard operating procedures and incident management plans to dam/water storage operation plans and preparations.</p> <p>2.3 Conduct inspections according to <b><i>organisational and statutory requirements</i></b>.</p>
<b>3 Implement dam / water storage operation plans.</b>	<p>3.1 Apply operation plans according to organisational and statutory requirements.</p> <p>3.2 Inspect and test <b><i>plant and equipment</i></b> according to manufacturer's guidelines and organisational requirements.</p> <p>3.3 Test, assess and document safety mechanisms.</p>
<b>4 Regulate flows.</b>	<p>4.1 Regulate <b><i>flow control mechanisms</i></b> to maintain safety of asset and required system supply and flood routing.</p> <p>4.2 Produce <b><i>data</i></b> relating to system operation and performance according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- calculate inflow and outflow rates
- interpret and plot graphs
- operate controls and ancillary equipment according to standard operating procedures
- conduct inspections
- coordinate and/or implement operational activities
- interpret plans, drawings, instructions, standard operating procedures, policies and standards
- use safety equipment and personal protective equipment
- use rescue equipment
- use tools and machinery
- identify hazards
- give and receive instructions
- communicate with other employees and customers
- collect and process data
- communicate
- use equipment and instruments
- interpret drawings, diagrams and charts
- produce reports
- inspect and operate instruments.

#### **Required knowledge:**

- properties of stored water
- system hydraulics
- effects of water and catchment conditions on flow expectations
- interrogation of catchment monitoring equipment
- water flow measurement
- operation of flood gates or plant
- control systems
- dam operation principles
- materials science (eg corrosion, paint coating)
- communication systems
- principles of hydraulics
- system layout
- environmental aspects of operation and maintenance
- lock out procedures for mechanical and electrical installations
- control systems

## **REQUIRED SKILLS AND KNOWLEDGE**

- equipment operation
- relevant utilities and service bodies
- hazardous materials handling
- effects of weather and conditions on bulkwater assets
- safe dam operating procedures
- principles of dam inspection
- risk management techniques
- occupational health and safety
- personal work site safety
- organisational and statutory requirements.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to manage and conduct surveillance of catchment run-off through dams and other water storage assets including:

- operating gated spillway in conformance with standard operating procedures
- interpreting technical documentation
- identifying and investigating operational problems
- collecting and analysing technical information
- preparing required reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Guidelines and regulatory requirements for dam or water storage operation*** include:

- International Commission on Large Dams
- Australian National Committee on Large Dams (ANCOLD) guidelines
- storages may include:
  - weirs
  - reservoirs.

***Organisational and statutory requirements*** may include:

- Occupational Health and Safety, including the use of personal protective equipment
- environmental laws and policies
- by-laws and organisational policies
- Water Acts
- construction and occupational health and safety regulations
- public safety and disaster plans
- International Commission on Large Dams
- Australian National Committee on Large Dams guidelines
- state government or state committees
- asset management plan.
- gantry crane operations
- two-way radio.

***Plant and equipment*** may include:

***Flow control mechanisms*** may include:

- sand dams
- temporary dam structures
- diversion of flows
- temporary and permanent bulkhead gates.

***Data*** may include:

- operation and maintenance manuals
- past inspection reports
- operation, monitoring and testing records
- observation and associated comments and reports
- original design plans
- design modifications
- construction records and reports
- survey information
- maintenance records

## **RANGE STATEMENT**

- performance data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## NWP319A Monitor and control dam operations

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to prepare for and implement dam operation plans, including inspection and testing of dam safety mechanisms

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with a specific responsibility for the operation of ungated dams.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for dam operation.</b>	<p>1.1 Check and apply <b><i>guidelines and regulatory requirements for dam operation</i></b> to operation plans.</p> <p>1.2 Apply relevant organisational policies, standard operating procedures and incident management to <b><i>dam operation plans and preparations</i></b>.</p> <p>1.3 Undertake <b><i>inspections</i></b> according to <b><i>organisational and statutory requirements</i></b>.</p>
<b>2 Implement dam operation plans.</b>	<p>2.1 Follow dam operation plans according to organisational requirements.</p> <p>2.2 Inspect and test <b><i>plant and equipment</i></b> according to manufacturer's guidelines and organisational requirements.</p> <p>2.3 Test and record <b><i>dam safety mechanisms</i></b>.</p>
<b>3 Compile and process operation reports.</b>	<p>3.1 Collect <b><i>operational data</i></b> from measurement instruments, inspections and team members.</p> <p>3.2 Collect, process, validate and record operational data and store it according to organisational requirements.</p> <p>3.3 Evaluate data and record and report structural, material and/or equipment problems.</p> <p>3.4 Recommend remedial action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify operational problems
- identify access problems
- identify security problems
- conduct inspections
- implement operational activities
- interpret plans, drawings, instructions, standard operating procedures, policies and standards
- use equipment and personal protective equipment
- use rescue equipment
- use relevant tools and machinery
- identify safety hazards
- give and receive instructions
- communicate with other employees and customers
- collect and process data
- communicate
- inspect and operate relevant equipment and instruments
- produce reports.

#### **Required knowledge:**

- properties of stored water
- basic dam design principles
- risks to dams -lessons from dam incidents
- dam safety emergency operations
- dam security issues
- dam access issues
- dam operation principles
- basic materials science (corrosion, paint coating)
- communication systems
- basic principles of hydraulics
- system layout
- environmental aspects of operation and maintenance
- lock out procedures for mechanical and electrical installations
- control systems
- equipment operation
- relevant utilities and service bodies
- hazardous materials handling

## **REQUIRED SKILLS AND KNOWLEDGE**

- effects of weather and conditions on bulkwater assets
- safe dam operating procedures
- principles of dam inspection
- risk management techniques
- occupational health and safety
- personal work site safety
- organisational and statutory requirements.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to prepare for and implement dam operation plans including:

- operating dams in compliance with standard operating procedures
- interpreting technical documentation
- identifying and investigating operational problems
- collecting and analysing technical information
- preparing required reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

## **EVIDENCE GUIDE**

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Guidelines and regulatory requirements for dam operation*** include:

- Australian National Committee on Large Dams (ANCOLD) guidelines

***Dam operation plans and preparations*** may include:

- owner's operations manual
- dam safety emergency plans

***Inspection*** procedures may include:

- owner's inspection manuals
- operation and maintenance manuals
- Safety Evaluation of Existing Dams (SEED) guidelines.

***Organisational and statutory requirements*** may include:

- occupational health and safety, including the use of personal protective equipment
- environmental laws and policies
- by-laws
- organisational policies and standards operating procedures
- Water Acts
- construction and occupational health and safety regulations
- public safety and disaster plans
- Australian National Committee on Large Dams guidelines
- state and local government or state committees
- asset management plan.

***Plant and equipment*** may include:

- valves
- pipes
- conduits
- electrical & mechanical operating systems
- hoists and cranes
- baulks
- trashracks
- trunnions.

***Dam safety mechanisms*** may include:

- monitoring equipment and systems, including telemetry.

***Operational data*** may include:

- operation and maintenance manuals
- past inspection reports

## **RANGE STATEMENT**

- operation, monitoring and testing records
- observation and associated comments and reports
- original design plans
- design modifications
- construction records and reports
- survey information
- maintenance records
- performance data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Dam safety

## **NWP320B Monitor and implement dam maintenance**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to conduct inspections of dams and implement dam maintenance programs, including maintenance of dam safety mechanisms. The ability to interpret technical documentation, investigate and resolve maintenance problems and to collect and analyse technical information are essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with a specific responsibility for the maintenance of ungated dams.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for dam maintenance.</b>	<p>1.1 Apply <b><i>guidelines and regulatory requirements for large dam maintenance</i></b> to maintenance plans.</p> <p>1.2 Apply relevant organisational policies, standard operating procedures and incident management plans to <b><i>dam maintenance plans and preparations</i></b>.</p> <p>1.3 Undertake <b><i>inspection procedures</i></b> according to organisational requirements.</p>
<b>2 Implement dam maintenance plans.</b>	<p>2.1 Apply dam maintenance plans according to <b><i>organisational and statutory requirements</i></b>.</p> <p>2.2 Maintain and repair <b><i>dam assets</i></b> according to manufacturer's guidelines and organisational requirements.</p>
<b>3 Compile maintenance and inspection reports.</b>	<p>3.1 Collect required <b><i>data</i></b> from inspections, measurement instruments and delegated personnel.</p> <p>3.2 Collate, process, validate, record and store data according to organisational and requirements.</p> <p>3.3 Evaluate data and record and report structural, material and/or equipment problems.</p> <p>3.4 Recommend remedial action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct maintenance problems
- identify security maintenance issues
- identify access maintenance issues
- conduct inspections
- coordinate maintenance activities
- interpret plans, drawings, instructions, standard operating procedures, policies and standards
- use safety equipment and personal protective equipment
- use rescue equipment
- use relevant tools and machinery
- identify safety hazards
- give and receive instructions
- communicate with other employees and customers
- carry out maintenance of specified assets
- propose and justify maintenance activities
- analyse and process data
- interpret diagrams, drawings and charts
- inspect and operate relevant equipment and instruments
- produce reports.

#### **Required knowledge:**

- dam design principles
- risks to dams
- historic dam information
- potential earthquake effects
- properties of stored water
- dam maintenance principles and practices
- basic materials science (corrosion, paint coating)
- communication systems
- basic principles of hydraulics
- system layout
- environmental aspects of maintenance
- lock out procedures for mechanical and electrical installations
- control systems
- equipment operation
- relevant utilities and service bodies

## **REQUIRED SKILLS AND KNOWLEDGE**

- hazardous materials handling
- effects of weather and conditions on bulkwater assets
- basic principles of soil mechanics
- basic concrete structure, strengths and deterioration
- basic dam construction procedures
- principles of dam inspection
- dam failure mechanisms
- risk management techniques
- occupational health and safety
- personal work site safety
- risk factors and potential hazards of maintenance of dam assets
- maintenance standard operating procedures
- organisational and statutory requirements.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to conduct inspections of dams and implement dam maintenance programs including:

- monitoring and implementing dam maintenance in conformance with standard operating procedures
- interpreting technical documentation
- identifying and investigating maintenance problems
- collecting and evaluating technical information
- preparing required reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

- Guidelines and regulatory requirements for large dam maintenance*** include:
- Australian National Committee on Large Dams (ANCOLD) guidelines
  -
- Dam maintenance plans and preparations*** may include:
- owner's operation and maintenance manuals
  - owner's inspection manuals
  - Safety Evaluation of Existing Dams (SEED) guidelines.
- Inspection procedures*** may include:
- owner's inspection manuals
  - owner's operation and maintenance manuals
  - Safety Evaluation of Existing Dams (SEED) guidelines.
- Organisational and statutory requirements*** may include:
- occupational health and safety, including the use of personal protective equipment
  - environmental laws and policies
  - by-laws and organisational policies
  - Water Acts
  - construction and occupational health and safety regulations
  - public safety and disaster plans
  - Australian National Committee on Large Dams guidelines
  - state and local government or state regulatory committees
  - asset management plan.
- Dam assets*** may include:
- earthen walls or embankments
  - concrete walls and structures
  - hydraulic structures
  - electrical equipment
  - spillways and dissipaters
  - outlets and intake structures
  - pipes
  - conduits
  - foundations
  - mechanical equipment, for example:
    - gates
    - valves
    - standby equipment

## **RANGE STATEMENT**

- baulks
- bulkheads
- cranes
- trashracks
- reservoir perimeter
- weirs
- drainage systems (surface and sub-surface)
- access roads
- hoists, ladders and platforms
- tunnels and galleries
- monitoring equipment
- survey monuments and monitoring points.

*Data* may include:

- operation and maintenance manuals
- past inspection reports
- operation, monitoring and testing records
- observation and associated comments and reports
- original design plans
- design modifications
- construction records and reports
- survey information
- maintenance records
- performance data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Dam safety

## **NWP321B Inspect and operate groundwater regulation**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to perform inspection, regulation, operation, measurement and reporting of groundwater systems.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with a specific responsibility for inspecting and checking groundwater sources.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Inspect and report on source performance and usage.</b>	<p>1.1 Carry out routine <i>inspections</i> of groundwater bores in accordance with <i>organisational and statutory requirements</i>.</p> <p>1.2 Collect and record data on groundwater usage and/or bore levels according to organisational requirements</p> <p>1.3 Collect and record water samples according to organisational requirements.</p> <p>1.4 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Check pumps and meters.</b>	<p>2.1 Test bore pumps and check flow meters to determine accuracy.</p> <p>2.2 Adjust pumps and flow meters to conform to the allocation permit.</p>
<b>3 Operate and coordinate processes.</b>	<p>3.1 Measure and record extraction volumes.</p> <p>3.2 Check extraction volumes for compliance with entitlement.</p>
<b>4 Complete documentation.</b>	<p>4.1 Record inspection results according to organisational requirements.</p> <p>4.2 Report source data to meet organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports
- calculate flows
- undertake source inspections
- follow standard operating procedures
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- identify control system faults
- use safety equipment and personal protective equipment
- identify potential sources of contamination.

#### **Required knowledge:**

- properties of stored water
- communication systems
- principles of hydraulics
- system layout
- control systems
- equipment operation
- relevant utilities and service bodies
- hazardous materials handling
- effects of weather and conditions on bulkwater assets
- principles of soil mechanics
- concrete structure, strengths and deterioration
- construction procedures
- risk management techniques
- occupational health and safety
- personal work site safety
- organisational and statutory requirements.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to perform inspection, regulation, operation, measurement and reporting of groundwater systems including:

- inspecting groundwater bores
- collecting and recording data
- collecting samples
- testing and adjusting pumps and flow meters to produce required flows
- recording extraction volumes and checking for compliance
- completing relevant documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Inspection*** may require:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - occupational health and safety
  - hazardous substances
  - mines and subsidence
  - road signage
  - electrical
  - dangerous goods
  - World Health Organisation and National Health and Medical Research Council (NHMRC) guidelines.

### Unit Sector(s)

Not applicable.

### Competency field

**Competency field**      Collection and distribution



## NWP322B Inspect and operate surface water systems

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to inspect and coordinate the operation of surface water systems and to measure and reporting on surface water usage and system performance. The ability to collect data and samples, monitor and adjust regulatory systems, coordinate system performance and produce technical reports are essential to performance.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff and operators with a specific responsibility for inspecting and operating surface water systems and for ensuring that flows are regulated according to organisational specifications and system demands.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Inspect and report on surface water system performance and usage.</b>	<p>1.1 Schedule and complete routine <b><i>inspections</i></b> of <b><i>surface supply areas</i></b>.</p> <p>1.2 Collect and record data on system capacity and flow according to <b><i>organisational and statutory requirements</i></b>.</p> <p>1.3 Collect and record water samples according to organisational requirements.</p> <p>1.4 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Monitor inflows, outflows and releases.</b>	<p>2.1 Inspect <b><i>flow regulating systems</i></b> and make adjustments to meet demand requirements.</p> <p>2.2 Monitor flows and coordinate diversions or extractions to control usage.</p> <p>2.3 Read meters and record volumes.</p>
<b>3 Operate and coordinate system performance.</b>	<p>3.1 Address and record process faults and operational conditions according to organisational requirements.</p> <p>3.2 Optimise process performance according to organisational requirements.</p>
<b>4 Complete documentation.</b>	<p>4.1 Record inspections results according to organisational requirements.</p> <p>4.2 Report data from inspection results according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify operational problems
- coordinate inspections
- produce reports
- collect and analyse data
- use safety equipment and personal protective equipment
- calculate flow and capacity
- coordinate surveillance
- interpret plans
- communicate with employees and customers
- use communication systems
- give and receive instructions
- identify control system faults.

#### **Required knowledge:**

- identify operational problems
- coordinate inspections
- produce reports
- collect and analyse data
- use safety equipment and personal protective equipment
- calculate flow and capacity
- coordinate surveillance
- interpret plans
- communicate with employees and customers
- use communication systems
- give and receive instructions
- identify control system faults.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to inspect and coordinate the operation of surface water systems including:

- inspecting surface supply areas
- collecting and recording data
- collecting samples
- inspecting and adjusting flow regulating systems
- monitoring flows
- coordinating diversions and extractions
- reading meters
- identifying and reporting faults
- integrating processes
- completing relevant documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

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experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Inspections*** includes:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - implementation of reporting procedures that may also include:
    - procedures for the implementation of by-laws
    - organisational policies
    - standard operating procedures
    - statutory requirements.
- Surface supply areas*** may include:
- direct catchment areas
  - rural locations.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - occupational health and safety including use of personal protective equipment
  - hazardous substances
  - road signage
  - electrical
  - dangerous goods
  - World Health Organisation standards
  - Australian Drinking Water Guidelines
  - Australian National Committee on Large Dams guidelines.
- Flow regulating systems*** may include:
- gravity fed systems
  - pumping systems
  - valving systems
  - control systems
  - gated storages
  - emergency overflow and diversion systems
  - inspection chambers
  - metered pits and flow chambers.
- Regulation of flow*** may
- the adjustment of gravity fed systems

## **RANGE STATEMENT**

require:

- pumping systems
- valving systems
- control systems
- gated storages
- emergency overflow and diversion systems
- inspection chambers
- metered pits and flow chambers.

*Specific storage inspection*  
may include:

- retaining walls and other major or minor structural components
- gates
- valves
- major or minor flow control and adjustment equipment.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## **NWP323B Monitor and coordinate catchment operations**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to inspect and monitor catchment areas, monitor flows and coordinate catchment processes. The ability to collect data and samples, monitor and adjust regulatory systems, identify and investigate catchment problems and produce technical reports is essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with a specific responsibility for monitoring and coordinating catchment operations. The level of responsibility may vary according to the size and complexity of the catchment area.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Inspect and monitor catchment operations.</b>	<p>1.1 Schedule routine <b><i>inspections</i></b> of catchment areas to identify <b><i>water quality risks</i></b> according to <b><i>organisational and statutory requirements</i></b>.</p> <p>1.2 Collect, analyse and report <b><i>catchment data</i></b> according to organisational requirements.</p> <p>1.3 Collect and record water samples according to organisational and statutory requirements.</p> <p>1.4 Monitor and report on activities within the catchment area according to organisational and statutory requirements.</p> <p>1.5 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Monitor inflows and outflows.</b>	<p>2.1 Inspect <b><i>flow regulating systems</i></b> and determine required adjustments to meet demand.</p> <p>2.2 Identify and report flows into and conditions of catchment areas according to organisational and statutory requirements.</p>
<b>3 Operate and coordinate catchment processes.</b>	<p>3.1 Identify, address and, if appropriate, report problems within catchment areas according to organisational requirements.</p> <p>3.2 Monitor and coordinate processes to maintain the parameters of operation.</p> <p>3.3 Integrate processes to improve source performance according to organisational requirements.</p>
<b>4 Complete documentation.</b>	<p>4.1 Review and action investigation results according to organisational requirements.</p> <p>4.2 Compile reports from catchment inspections according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports and logs
- use safety equipment and personal protective equipment
- use pest eradication equipment
- calculate flow and capacity
- coordinate safety surveillance
- interpret plans
- interpret policies and standard operating procedures
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- identify control system faults
- identify water quality risks and prepare protection strategies.

#### **Required knowledge:**

- inspection of catchments
- coordination processes
- system layout
- system processes
- environmental aspects of catchment areas
- safety procedures
- policies and standard operating procedures
- a general understanding of water and wastewater treatment and the effect of floods on these systems
- Australian Drinking Water Guidelines
- hazardous substances handling
- communication systems
- risk factors and potential hazards involved with catchment area processes, equipment operation, capacity and limitations
- effects of weather and conditions on operation of catchment areas
- pumping and valving systems
- control systems
- pest control specifications.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to inspect and monitor catchment areas, monitor flows and coordinate catchment processes including:

- inspecting catchment areas and identifying water quality risks
- monitoring catchment and collecting and reporting catchment data
- collecting samples
- inspecting and adjusting flow regulating systems
- identifying and reporting on flows into the catchment area
- assessing and reporting on the condition of the catchment area
- identifying and addressing risks and hazards
- monitoring and integrating catchments processes
- completing documentations
- implementing actions resulting from investigations.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Inspections*** may require:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - implementation of reporting procedures including:
  - procedures for the implementation of by-laws
  - organisational policies
  - standard operating procedures
  - statutory requirements.
- Water quality risks*** may include:
- herbicide run-off
  - dead and decaying wildlife and stock animals
  - animal and bird faeces
  - corrosion of plant and equipment.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - occupational health and safety, including use of personal protective equipment
  - dangerous goods and hazardous substances
  - road signage
  - electrical
  - dangerous goods
  - World Health Organisation standards
  - Australian Drinking Water Guidelines
  - Australian National Committee on Large Dams guidelines.
- Catchment data*** may include:
- aerial photographs
  - satellite photographs
  - catchment officer/ranger reports.
- Flow regulating systems*** may include:
- pumping systems
  - valving systems
  - control systems
  - emergency overflow and diversion systems.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## **NWP324B Inspect and report river regulation operations**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to inspect and monitor river systems, coordinate river system operations and measure and report on river flows, including flood plains and river environments. The ability to collect data and samples, monitor and adjust regulatory systems, identify and investigate river system problems and to produce technical reports are essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with a specific responsibility monitoring and coordinating river regulation operations.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Inspect and monitor system performance and usage.</b>	<p>1.1 Schedule routine <i>inspections</i> of rivers or waterways and monitor problem reporting according to <i>organisational and statutory requirements</i>.</p> <p>1.2 Collect and report on data relating to the condition of the river system and usage according to organisational requirements.</p> <p>1.3 Monitor the collection and recording of water samples according to organisational procedures and <i>equipment used</i>.</p> <p>1.4 Monitor water quality according to organisational requirements.</p>
<b>2 Regulate flows.</b>	<p>2.1 Inspect <i>flow regulating systems</i> and determine and apply adjustments required to meet demand.</p> <p>2.2 Regulate river flows according to organisational requirements.</p>
<b>3 Operate and coordinate processes.</b>	<p>3.1 Identify, address and report conditions of the river system according to organisational requirements.</p> <p>3.2 Integrate processes to improve river system performance according to organisational and statutory requirements.</p> <p>3.3 Receive, analyse and report flood plain data according to organisational requirements.</p>
<b>4 Complete documentation.</b>	<p>4.1 Review and action investigation results according to organisational requirements.</p> <p>4.2 Compile reports from river system data to meet organisational requirements.</p>



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports and logs
- collect and analyse data
- use safety equipment and personal protective equipment
- use marine craft
- interpret plans, policies, procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- identify control system faults
- identify water quality risks and prepare protection strategies.

#### **Required knowledge:**

- river flow regimes
- coordination processes
- environmental aspects of river systems
- system processes
- safety procedures
- policies, standard operating procedures and legislation
- communication systems
- risk factors and potential hazards involved with river systems
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of river systems
- pipes and fittings
- pumping and valving systems
- control systems
- pest control specifications.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to inspect and monitor river systems, coordinate river system operations and measure and report on river flows including:

- inspecting rivers and waterways
- monitoring river systems and collecting and reporting data
- collecting samples
- inspecting and adjusting flow regulating systems
- assessing and reporting on the condition of the river system area
- analysing flood plain data
- monitoring and integrating river system processes
- completing documentation
- implementing actions resulting from investigations.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Inspection*** may require:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies, standard operating procedures and statutory requirements.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - occupational health and safety, including use of personal protective equipment
  - World Health Organisation standards
  - relevant Australian Standards
  - manufacturer's standards and specifications
  - Australian Drinking Water Guidelines.
- Equipment used*** may include:
- electronic monitoring and metering systems
  - manual chart recording systems
  - on- and off-road vehicles
  - marine craft
  - personal protective equipment
  - communication equipment.
- Flow regulating systems*** may include:
- pumping systems
  - valving systems
  - control systems.

## Unit Sector(s)

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP326A Conduct and report dam safety instrumentation monitoring

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to plan, implement and report on the monitoring of basic instrumentation installed in dams to provide assurance of their ongoing safety.

This unit of competency replaces NWP325B Conduct and report on dam safety inspection and basic monitoring.

## Application of the Unit

**Application of the unit** This unit is required by staff with responsibility for monitoring the safety of a dam and reporting faults or trends.

The unit of competency is part of the skill sets:

- Monitor and inspect concrete dams.
- Monitor and inspect embankment dams.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for dam safety monitoring.	1.1 Identify <b><i>organisational procedures and guidelines</i></b> for dam safety monitoring.
	1.2 Identify and apply operational procedures determining the techniques, methods and equipment used for dam safety monitoring.
	1.3 Schedule work activities according to workplace requirements and data collection equipment and methods.
2 Conduct dam safety monitoring.	2.1 Implement <b><i>dam safety monitoring procedures and practices</i></b> including <b><i>unusual events</i></b> according to organisational procedures.
	2.2 Ensure equipment is functioning and fit for purpose.
	2.3 Take and record <b><i>dam instrumentation</i></b> readings to the required level of accuracy and frequency.
	2.4 Recognise and report any monitoring data that may indicate <b><i>faults or changes</i></b> outside expected range.
3 Report on dam safety monitoring.	3.1 Add newly recorded information on dam behaviour to historical monitoring information.
	3.2 Prepare and submit accurate, timely, clear and concise monitoring instrumentation data to meet organisational requirements.
	3.3 Report deviations outside approved limits including potential causes and make recommendations for follow up action.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

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

#### **Required skills:**

- follow instructions, standard operating procedures, policies and standards for dam safety monitoring and instrumentation
- collect and process data
- read and interpret plans, drawings and charts
- record and report monitoring and safety information and interpret a range of workplace documents
- use mathematical calculations to collect and process data on dam safety
- produce dam instrumentation monitoring reports
- inspect and operate monitoring equipment and instruments
- communicate deviations and faults in equipment and data using clear and direct communication and relevant communication methods and equipment
- apply occupational safety protocols for working with dam assets and dam safety, including working in confined spaces.

#### **Required knowledge:**

- principles of dam design and construction
- causes of dam failures and incidents
- impact of unusual events on dam safety
- types of instrumentation and their application
- requirements for installation of instruments and instrument failure
- purpose of monitoring and instrumentation used
- instructions for the operation of monitoring equipment
- dam safety performance indicators
- OH&S procedures related to dam monitoring and working in confined spaces
- dam faults and changes indicated by monitoring and instrumentation
- organisational and statutory requirements related to monitoring and reporting dam safety.



## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate to ability to plan, implement and report on the monitoring of basic instrumentation installed in dams:

- preparing monitoring activity
- setting up relevant instrumentation
- interpreting and applying all relevant organisational and regulatory information and requirements in planning dam safety monitoring activities
- identifying dam safety monitoring sites and scheduling activities according to the required frequency of reporting
- conducting inspection and monitoring activities using standard workplace equipment and instruments
- gathering and recording data
- identifying faults, changes and failure indicators
- reporting on dam safety monitoring outcomes, with recommendations for action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in dam operation worksites
- codes, standards, and government regulations relevant to monitoring dam safety.

Candidates should have access to on and off the job learning and assessment support when evidence is inadequate and competency has not yet been achieved.

Candidates' level of English language and literacy should be taken into account in designing assessment and adjustments should be recorded in assessment plans.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

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and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning and examination to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Organisational procedures and guidelines*** will include:

- Australian National Committee on Large Dams (ANCOLD) guidelines
- dam monitoring templates and proformas
- relevant regulator's technical bulletins
- occupational health and safety information
- operation and maintenance information and manuals
- instrumentation records, plans and manuals
- dam safety performance indicators
- roles, responsibilities and delegations for instrumentation monitoring and action
- security and storage of data
- dam safety inspection manuals
- past inspection reports design and construction reports, surveillance reports and risk assessments
- prescribed surveillance schedules
- incident management plans
- data storage and security
- state and local government requirements
- standard operating procedures
- asset management plan.

***Dam safety monitoring procedures and practices*** include:

- monitoring details will include:
  - adequate timeframe and resources
  - visual observation
  - use of manual, electronic and/or computer equipment
  - operational preparedness checks
  - dam condition assessments
  - site security and access
  - dam safety emergency indicator reporting
  - checklists and previous monitoring reports.
  - sites to be monitored may include:
    - earthen walls and/ or embankments
    - concrete walls and structures
    - hydraulic structures

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- monitoring equipment
- spillways/ diversions systems
- outlet works/ intake structures
- pipes/ conduits
- abutments and foundations
- reservoir perimeter and downstream areas
- weirs
- tunnels and galleries
- drainage systems.
- monitoring data will include:
  - seepage and leakage
  - pore pressures
  - stresses and strains
  - water levels
  - movements (external and internal)
  - rainfall
  - temperature.
- seismic events
- floods
- extreme inflows
- rapid draw down
- landslides and slips
- dam incidents
- sabotage / terrorist attack
- fires
- long term low storage levels.
- seepage measurement devices
- water level recorders
- piezometers / stand pipes
- extensometers
- earth pressure cells
- cross arms
- hydrostatic settlement cells
- pendulums
- inclinometers
- strain gauges
- crack monitoring instrumentation
- joint meters
- external survey systems
- rain gauges

*Unusual events* will include:

*Dam instrumentation* will include those used in the workplace from the range:

## **RANGE STATEMENT**

*Faults and changes* will include:

- thermometers.
- stresses/strains
- pore pressures
- slumps, slips and slides
- earth pressures
- seepage and leakage
- misalignment/movement
- weather conditions.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Dam safety

## **NWP327A Inspect and report on concrete dam safety**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to plan, implement and report on concrete and masonry dam safety inspection. This requires the operator to conduct routine visual inspection, capture and report dam condition and faults in dams. Dam safety operators should be aware of the damage potential of the dam and be able to recognise and report deficiencies, or adverse trends that could lead to failure.

### **Application of the Unit**

**Application of the unit** This unit is required by operators with responsibility for the inspection of concrete dams and reporting of faults or trends.

This unit forms part of the skills set for:

Monitor and inspect concrete dams

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare concrete dam inspection</b>	1.1 Identify and apply the relevant <i>organisational procedures and proformas</i> relating to concrete dam safety inspection. 1.2 Identify features of concrete dam types and their applications relevant to the dams to be inspected. 1.3 Identify concrete <i>dam behaviour</i> under a range of <i>conditions</i> . 1.4 <i>Assess</i> information from checklists and previous inspection reports. 1.5 Schedule activities and equipment for concrete dam inspection according to workplace requirements.
<b>2 Inspect and assess the condition of components of concrete dams</b>	2.1 Implement concrete dam inspection procedures and practices including for <i>unusual events</i> according to <i>organisation and regulatory information</i> . 2.2 Inspect and assess the condition and performance of identified areas and features of the concrete dam. 2.3 Recognise, record and assess any faults and changes in the condition of the concrete dam and its appurtenant structures.
<b>3 Report the condition of the components of the concrete dams</b>	3.1 Compare observations with previous inspection reports. 3.2 Collect and record <i>evidence</i> to establish the extent of changes in conditions. 3.3 Prepare and submit inspection reports to meet organisational requirements. 3.4 Report significant changes and deviations with recommendations for follow up action.



## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- follow instructions, standard operating procedures, policies and standards for concrete dam safety
- plan and organise work schedules and responses to contingencies
- communicate with engineering professionals, team members and the public on concrete dam safety using clear and direct communication and identifying and confirming monitoring requirements
- record and report information and interpret a range of workplace documents
- make mathematical calculations to collect and process data from dam inspections
- identify concrete dam faults and failure indicators
- assess the importance and urgency of deficiencies
- collect and process concrete dam observation information
- read and interpret plans, drawings and charts
- produce inspection reports
- identify safety hazards and implement safety protocols
- use digital photography and equipment for determining location.

#### Required knowledge:

- concrete dam types, elements, and failure modes
- historic information and lessons from previous concrete dam incidents
- properties of stored water
- concrete dam design and construction principles, including basic:
  - materials science
  - hydraulics
  - aging of concrete
  - concrete technology
  - treatment of foundations, grouting and drainage systems
  - post tensioning principles
  - principles of gravity action
  - principles of arch action
  - principles of buttress action
  - principles of roller compacted concrete
  - uplift pressures and drainage systems
  - concrete dam faults and change indicators
  - dam performance history
  - principles of concrete dam inspection
- occupational health and safety and personal work site safety in procedures and worksite specific requirements

## **REQUIRED SKILLS AND KNOWLEDGE**

- organisational policies, procedures, guidelines and requirements relevant to the work site and dam safety monitoring.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to conduct and report on concrete dam safety inspection including:

- interpreting and applying relevant organisational and regulatory information and requirements to the planning of safety monitoring activities
- identifying inspection features and scheduling activities according to the required frequency
- conducting concrete dam inspection activities
- gathering and recording data
- identifying faults, changes and failure indicators
- reporting on inspection and monitoring outcomes, with recommendations for action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documents that should normally be available in dam workplaces
- codes, standards, and government regulations applying to dam monitoring.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be

## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning and or examination to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Organisational procedures and proformas*** will include:

- Australian National Committee on Large Dams (ANCOLD) guidelines
- dam monitoring templates and proformas
- relevant regulator's technical bulletins
- occupational health and safety information
- operation and maintenance information and manuals
- instrumentation records, plans and manuals
- dam safety performance indicators
- roles, responsibilities and delegations for instrumentation monitoring and action
- security and storage of data
- dam safety inspection manuals
- past inspection reports design and construction reports, surveillance reports and risk assessments
- prescribed surveillance schedules
- incident management plans
- data storage and security
- state and local government requirements
- Standard Operating Procedures
- asset management plan.

***Dam behaviour*** will include:

- horizontal and vertical movement of concrete dams
- leakage and seepage through drainage systems under a range of weather and storage content situations
- structural movements expected during and post earthquakes
- and may include:
- vibration and water flow patterns.

***Conditions*** may include:

- climatic
- geological
- location
- dimensions
- catchment.

***Assess*** will include:

- analyse observations

## RANGE STATEMENT

- Unusual events* will include:
- make judgements of urgency and seriousness of problem
  - priorities for action.
  - seismic events
  - floods
  - extreme inflows
  - rapid draw down
  - landslides and slips
  - dam incidents
  - sabotage/terrorist attack
  - fires
  - long term low storage levels.
- Organisational and regulatory information* will include:
- Australian National Committee on Large Dams (ANCOLD) guidelines
  - past inspection reports, surveillance reports and risk assessments
  - survey information
  - relevant regulator's technical bulletins
  - occupational health and safety information
  - operation and maintenance manuals
  - dam performance history
  - dam safety performance indicators
  - dam safety inspection manuals
  - and may include:
    - design and modification plans and reports
    - construction records and reports.
  - dam structure
  - concrete walls and structures
  - hydraulic structures
  - spillways/diversions systems
  - outlet works / intake structures
  - pipes/conduits
  - abutments and foundations
  - access to areas
  - reservoir perimeter and downstream areas
  - weirs and monitoring installations
  - tunnels, galleries and drainage systems.
  - and may include:
    - mechanical and electrical components including valves, winches, hydraulic and electrical systems
    - civil infrastructure including ladders, pipe work, and
- Identified areas and features* will include:

## RANGE STATEMENT

- Inspection techniques and details* will include:
- security
  - post tensioning anchors.
  - visual observation and note taking
  - use of manual, electronic and/or computer equipment and digital camera
  - dam condition assessments
  - site security
  - site access
  - concrete dam safety emergency indicator reporting
  - landslides and environmental conditions
  - details of concrete dam sites to be inspected.
- Faults and changes* will include:
- cracks (existing and new)
  - drain blockage
  - seepage/leakage
  - cavitation
  - foundation piping
  - misalignment/movement/instability
  - settlement
  - concrete deterioration
  - alkali aggregate reaction
  - concrete defects:
    - efflorescence
    - honeycombing
    - segregation
    - erosion
    - chemical attack
  - joint damage/deterioration
  - maintenance concerns including:
    - vegetation in joints or cracks
    - missing or damaged sealants and water bars
    - leaking or inoperative valves and gates
    - damaged monitoring instrumentation.
- Evidence* may include:
- flood, rainfall and relevant weather information
  - incident details including seismic
  - inspection findings
  - location and extent of faults and changes
  - photographs
  - monitoring data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Dam safety



# NWP328A Inspect and report on embankment dam safety

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to plan, implement and report on embankment dam safety inspection. This requires the operator to conduct routine visual inspection, capture and report dam condition and faults in dams constructed primarily from earth and rock materials. Dam safety operators should be aware of the damage potential of the dam and be able to recognise and report deficiencies, or adverse trends that could lead to failure.

## Application of the Unit

**Application of the unit** This unit is required for staff with responsibility for the inspection of embankment dams and reporting of faults or trends.

This unit forms part of the skills set for:

Monitor and inspect embankment dams

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare embankment dam inspection.</b>	1.1 Identify and apply <i>organisational requirements</i> relating to embankment dam safety inspection. 1.2 Identify <i>features of embankment dam types</i> and their applications to the dams to be inspected. 1.3 Identify <i>embankment dam behaviour</i> under a range of conditions. 1.4 Gather and validate checklists and previous inspection reports. 1.5 Schedule activities for embankment dam inspection according to workplace requirements.
<b>2 Inspect and assess the condition of components of embankment dams.</b>	2.1 Implement embankment dam inspection procedures and practices according to <i>organisational requirements</i> , including for <i>unusual events</i> . 2.2 Inspect and assess the condition and performance of identified areas and features of embankment dams. 2.3 Recognise, record and assess any faults and changes in the condition of the embankment dam and its appurtenant structures.
<b>3 Report the condition of the components of embankment dams.</b>	3.1 Identify the purpose and audience of dam safety reports. 3.2 Collect and record <i>measurements and evidence</i> to establish the extent of changes in conditions 3.3 Prepare and submit reports to meet organisational requirements.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- follow instructions, standard operating procedures, policies and standards for embankment dam safety
- plan and organise work schedules and responses to contingencies
- communicate with engineering professionals, team members and the public on dam safety using clear and direct communication
- record and report dam safety data using organisation information systems
- make mathematical calculations to collect and process data from dam inspections
- identify embankment dam faults and failure indicators
- assess the importance and urgency of deficiencies
- collect and process embankment dam inspection observations
- read and interpret plans, drawings and charts
- produce embankment dam inspection reports
- apply safety hazards protocols
- use digital photography and locational equipment.

#### Required knowledge:

- embankment dam types (including concrete faced rock fill dams), elements, zones, risks and failure modes
- historic information and lessons from previous embankment dam incidents
- potential earthquake effects and damage
- properties of stored water
- embankment dam design and construction principles, including basic understanding of:
- materials science (in particular soil and rock properties)
- hydraulics and erosion by water
- principles of filters, piping and embankment stability
- treatment of foundations, grouting and drainage system
- pore pressures
- causes of cracks and settlement
- dam performance history
- principles of embankment dam inspection
- occupational health and safety and personal work site safety relevant to worksite and working with dams including working in confined spaces
- organisational policies, procedures, guidelines and requirements relevant to the work site and dam safety monitoring.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to conduct and report on embankment dam safety inspection including:

- interpreting and applying relevant organisational and regulatory information and requirements to the planning of inspection activities
- identifying inspection features and scheduling activities according to the required frequency
- conducting embankment dam inspection activities
- gathering and recording data
- identifying faults, changes and failure indicators
- reporting on inspection and monitoring outcomes, with recommendations for action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made

## EVIDENCE GUIDE

when the assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning or examination to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

#### ***Organisational***

***requirements*** will include:

- Australian National Committee on Large Dams (ANCOLD) guidelines
- past embankment dam inspection reports, surveillance reports and risk assessments
- survey information
- relevant regulator's technical bulletins
- occupational health and safety information, regulations and procedures
- operation and maintenance information
- dam performance history
- dam safety performance indicators
- environmental laws and policies
- incident management plans
- public safety and disaster plans
- state and local government requirements
- standard operating procedures
- asset management plan
- dam safety inspection manuals
- and may include:
  - design and modification plans and reports
  - construction records and reports.

#### ***Features of embankment dam types*** will include:

- soil mechanics and its application in dam embankments design
- foundations, grout curtains and filter systems
- spillway and water regulation options for a range of embankment dams
- dam structure
- embankment walls and structures
- hydraulic structures
- spillways/ diversions systems
- outlet works/ intake structures
- pipes/ conduits
- abutments and foundations

## RANGE STATEMENT

- access to areas
  - reservoir perimeter and downstream areas
  - weirs and monitoring installations
  - tunnels, galleries and drainage systems
  - and may include:
    - mechanical and electrical components including valves, winches, hydraulic and electrical systems
    - civil infrastructure including ladders, pipe work, and security
    - post tensioning anchors.
  - design of the embankment downstream, upstream and settlement movement of the embankment
  - leakage and seepage through drainage systems under a range of weather and storage content situations
  - structural vibration and water flow patterns of regulated and flood waters
  - structural movements expected during and post earthquakes.
- Embankment dam behaviours* will include:
- seismic events
  - floods
  - extreme inflows
  - rapid draw down
  - landslides and slips
  - dam incidents
  - sabotage / terrorist attack
  - fires
  - long term low storage levels.
- Unusual events* may include:
- visual observation and note taking
  - use of manual, electronic and/or computer equipment and digital camera
  - dam condition assessments
  - site security
  - site access
  - embankment dam safety fault indicator reporting
  - landslides and environmental conditions
  - details of sites to be inspected and monitored, including:
    - embankment crest, slopes and groins
    - downstream toe area
    - walls retaining earth/rock fill
    - spillways/ diversions systems
    - outlet works/ intake structures
- Identified areas and features* will include:

## RANGE STATEMENT

*Faults and changes* will include:

- pipes/ conduits
- abutments and foundations
- reservoir perimeter and downstream areas
- weirs and monitoring installations
- galleries.

*Measurements and evidence* will include:

- cracks
- slips
- seepage
- embankment and foundation piping
- sinkholes
- erosion and rutting
- settlement and movement
- deterioration
- animal and human activity:
- burrowing
- vandalism
- maintenance concerns:
- dense overgrowth
- blocked drainage
- leaking or inoperative valves and gates
- damaged monitoring instrumentation.
- flood, rainfall and relevant weather information
- visual observation and note taking
- manual, electronic and/or computer equipment and digital camera
- dam condition assessments
- site security
- site access
- embankment dam safety fault indicator reporting
- seismic and other incident details
- inspection findings
- location and extent of faults and changes
- photographs
- monitoring data.

## Unit Sector(s)

Not applicable.



## Competency field

**Competency field**     Dam safety

# NWP330B Establish positions of underground utilities using locating devices

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes outcomes required to determine and mark the location and identity of gas, water, electrical, telecommunications and other underground utility services using a range of specialised instruments and asset plans.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with a specific responsibility for identifying the presence and exact position of utility services prior to commencing work tasks involving excavation.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for locating services.</b>	<p>1.1 Determine work site boundaries and task requirements from plans, specifications and instructions.</p> <p>1.2 Use available <b><i>information sources</i></b> for the location of underground <b><i>services</i></b> and consider the presence of <b><i>undocumented services</i></b>.</p> <p>1.3 Select and check appropriate <b><i>pipe and cable locating equipment</i></b>.</p> <p>1.4 Assess <b><i>hazards</i></b> associated with underground services and plan preventive measures.</p>
<b>2 Operate pipe and cable locating equipment.</b>	<p>2.1 Mark work site boundaries and set up work-site according to <b><i>organisational and statutory requirements</i></b>.</p> <p>2.2 Operate pipe and cable locating equipment according to manufacturer's specifications and guidelines.</p> <p>2.3 Interpret spurious signals or interference with pipe and cable locating equipment and make appropriate compensation.</p> <p>2.4 Identify and remedy malfunctions of locating instruments.</p> <p>2.5 Mark the approximate location of services on the surface of the work site <b><i>according to organisational and statutory requirements</i></b>.</p> <p>2.6 Obtain confirmation of services' locations prior to excavation, according to organisational and statutory requirements.</p>
<b>3 Maintain locating equipment.</b>	<p>3.1 Perform daily maintenance of equipment according to organisational and manufacturer's requirements.</p> <p>3.2 Record maintenance details in a logbook according to organisational and manufacturer's requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- use pipe and cable locating equipment
- interpret policies, procedures and standard operating procedures
- provide maintenance records for equipment
- solve problems
- use basic mathematics for calculation and measurement
- collect data
- analyse data to take remedial action
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- communicate with employees, other service providers and customers
- use communication equipment
- give and receive instructions
- identify hazards.

#### **Required knowledge:**

- system hydraulics
- system layout
- environmental requirements
- lock out procedures for mechanical and electrical installations
- legal and social consequences of service disruption
- relevant utilities and service bodies
- communication systems
- landscape and ground structure of work area
- risk assessment and the identification of potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on site or plant.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to determine and mark the location and identity of gas, water, electrical, telecommunications and other underground utility services including:

- identifying work site and task requirements
- accessing appropriate sources of information for location of underground services
- assessing the possible presence of undocumented services
- selecting appropriate locating equipment
- assessing the site hazards and take preventive action
- marking out the worksite
- operating utility locating device, including compensation for spurious signals
- identifying and correcting equipment malfunction
- marking and confirming location of utilities
- maintaining equipment on good working order
- completing relevant documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- separated by further learning and practice
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
  - all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
  - where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
  - assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Information sources*** may include:

- Dial before you Dig service
- service search diagrams
- asset owner
- land owner.

***Services*** may include:

- electricity
- gas
- fuel and oil
- water
- sewer and stormwater
- telecommunication lines
- pay television
- road traffic control
- power cables
- steam pipes
- relevant surface fittings.

***Undocumented services*** may include:

- customer's service from main service
- private street lighting
- private effluent mains.

***Pipe and cable locating equipment*** may include:

- equipment suitable for locating pipes such as:
  - vitrified clay
  - reinforced concrete
  - polyvinyl chloride (PVC)
  - polyethylene
  - cast iron cement lined
  - ductile iron cement lined
  - glass reinforced plastic
  - mild steel cement lined
- equipment suitable for locating cables, such as:
  - post tensioning cables
  - earthing cables.

***Hazards*** may include:

- contact with live conductors
- injury from high pressure gas stream
- engulfment.

## **RANGE STATEMENT**

*Organisational and statutory requirements* may include:

- by-laws or organisational policies
- standard operating procedures
- environment protection
- occupational health and safety, including the use of personal protective equipment
- mines and subsidence
- road signage
- electrical safety
- dangerous goods
- manufacturer's guidelines.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution



## **NWP331B Inspect conduit and report on condition and features**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to plan, prepare and conduct an inspection of gravity sewer or stormwater conduits, using specialised CCTV camera and transport systems, and reporting on observed defects and other features of the conduit in accordance with the industry code and job specifications. The ability to interpret technical information, identify and assess hazards, operate and maintain specialised technical equipment and produce computer generated reports on the condition and features of the conduit inspected are essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operators with a specific responsibility for: inspecting and reporting on the condition of operational gravity sewers and stormwater conduits and new or rehabilitated sewers or stormwater conduits; and operating and maintaining specialised CCTV inspection equipment in compliance with organisational and statutory requirements. This unit may also be applied to the inspection of other types of conduit system.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for conduit inspection.</b>	<ul style="list-style-type: none"> <li>1.1 Identify the purpose of the inspection and the location, size, type and extent of the <i>conduit assets</i> from <i>relevant documentation</i>.</li> <li>1.2 Determine the inspection method and <i>equipment</i> to be used according to <i>organisational and statutory requirements</i>.</li> <li>1.3 Conduct and document hazard identification and risk assessment and implement appropriate <i>risk control processes</i>.</li> <li>1.4 Establish and implement <i>asset isolation / flow management plans</i> and inspection schedules in consultation with the system operator.</li> <li>1.5 Arrange for <i>preparation of the conduit and site for inspection</i> as required.</li> </ul>
<b>2 Operate and maintain equipment.</b>	<ul style="list-style-type: none"> <li>2.1 Set up and calibrate equipment to suit the size, type and conditions of conduit according to relevant <i>industry codes and/or specifications</i>.</li> <li>2.2 Operate equipment according to relevant industry codes and/or specifications and examine, record and report <i>features of the conduit</i> accurately.</li> <li>2.3 Conduct routine maintenance of equipment in accordance with manufacturer's recommendations.</li> <li>2.4 Diagnose and correct equipment malfunctions.</li> <li>2.5 Recognise and appropriately respond to <i>potential risks to equipment and/or system operation</i>.</li> </ul>
<b>3 Identify and code defects and other features observed during conduit inspection.</b>	<ul style="list-style-type: none"> <li>3.1 Identify and code structural defects, service conditions and other features of the conduit according to relevant industry codes and/or specifications.</li> <li>3.2 Record asset and inspection <i>data</i> using approved data capture software according to relevant industry codes and/or specifications.</li> <li>3.3 Investigate and report unrecognisable defects, service conditions or other features.</li> <li>3.4 Identify a conduit at risk of imminent failure and communicate details to the system operator or owner according to organisational and statutory requirements.</li> <li>3.5 Identify and report defects or malfunctioning of access structures in accordance with industry codes and/or specifications.</li> </ul>
<b>4 Withdraw inspection equipment and reinstate system operation.</b>	<ul style="list-style-type: none"> <li>4.1 Clean and inspect equipment for damage during and after withdrawal from the conduit.</li> <li>4.2 Reinstatement system operation according to asset isolation / flow management plan and/or specifications.</li> <li>4.3 Restore work site to meet organisational, safety, property owner's</li> </ul>

**ELEMENT****PERFORMANCE CRITERIA**

and environmental requirements.

**5 Review, record and report work.**

- 5.1 Check inspection data and video records prior to removal of equipment for completeness, quality and accuracy.
- 5.2 Compile *conduit inspection reports* and present to the client in the required format.
- 5.3 Complete job documentation and communication according to the asset owner or operator's, and statutory requirements.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify structural defects, service conditions and other features in a range of different conduits
- apply industry inspection reporting code requirements
- use data capture software
- operate CCTV camera controls and recording systems
- identify and solve operational problems
- operate communication equipment
- access and interpret GIS data, interpret plans/maps, house service diagrams, instructions, specifications and standard operating procedures
- interpret policies, procedures and standards
- use safety equipment and personal protective equipment
- use tools and instruments associated with camera/transport operation, maintenance and calibration
- identify hazards
- give and receive instructions
- communicate with customers and other employees
- prepare and restore work site.

#### Required knowledge:

- industry inspection reporting code
- data capture, recording and reporting software
- occupational health and safety
- confined space entry procedures
- typical traffic control arrangements
- personal work site safety
- potential hazards and risk factors of operational processes
- equipment operation
- techniques of operation in unusual situations
- capabilities of camera, lights and transport system
- routine maintenance and calibration requirements of camera, lights and transport system
- effects of weather and conditions on operation of site or plant
- environmental aspects of operation and installation
- features of conduits used in Australia for gravity sewer and stormwater construction over the last 100 years
- construction and operation of sewerage and stormwater systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to plan, prepare and conduct an inspection of gravity sewer or stormwater conduits including:

- preparing for conduit inspection by:
- identifying the location and extent of the work, methods to be applied, and equipment, including safety equipment, to be used
- assessing risks and preparing for hazards
- implementing appropriate isolation and inspection procedures
- calibrating equipment for conduit inspection
- operating and maintaining equipment
- conducting inspections and identifying and coding conduit defects and condition
- recording data manually, or using approved software program
- investigating and recording anomalies
- reporting conduit at risk of failure
- removing equipment and reinstating system operation
- restoring worksite
- completing and processing inspection information according to organisational procedures.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of

## EVIDENCE GUIDE

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Conduit assets*** may include:
- pipes, including those manufactured from:
  - vitrified clay (earthenware)
  - reinforced concrete
  - polyvinyl chloride (PVC)
  - polyethylene
  - polypropylene
  - unlined cast iron
  - cast iron cement lined
  - asbestos cement
  - ductile iron cement lined
  - glass reinforced plastic
  - mild steel cement lined
  - profiled thin gauge steel
  - other types of conduit, including:
  - concrete box culverts
  - circular or oviform brick
  - circular or oviform cast in situ concrete
  - circular, rectangular or variable cross section stone masonry block
  - lined pipes
  - other cross sections
  - asset structures, such as:
  - maintenance holes
  - maintenance shafts
  - drainage pits.
- Relevant documentation*** may include:
- plans
  - GIS asset data on digital media
  - drawings
  - 'house' service diagrams
  - specifications
  - work instructions.
- Equipment used*** may include:
- specialised closed circuit television conduit inspection equipment and associated apparatus
  - hand-held still camera



## RANGE STATEMENT

- computer hardware and software for data entry
- hand and power tools
- manhole cover lifters
- lifting and winching equipment
- mechanical excavation equipment
- pneumatic and motorised equipment:
- compressors
- pneumatic spades and attachments
- motorised cutting equipment
- on- and off-road vehicles
- road signage
- portable pumps
- sewer plugs - pneumatic, or other types
- communication equipment
- breathing apparatus
- gas detection equipment
- rescue equipment
- appropriate personal protective equipment.
- interpretation or assessment of:
- specifications
- instructions
- codes
- conduit size and configuration
- access to conduit
- sewerage or stormwater system operation.
- by-laws
- organisational policies
- standard operating procedures
- communication and reporting protocols
- environment protection
- occupational health and safety, including the use of personal protective equipment
- lifts and cranes
- mines and subsidence
- road signage
- electrical
- dangerous goods.
- traffic control arrangements
- grating or barricading of openings
- asset isolation/flow control

*Organisational and statutory requirements* may include:

*Risk control processes* include:

## RANGE STATEMENT

- compliance with confined space entry procedures
  - compliance with asset access procedures
  - personal protective equipment such as gloves
  - personal hygiene practices.
- Asset isolation /flow management plans*** may include:
- arrangements with system operator or owner for:
  - shutting down, tagging and/or lockout of parts of the system, for example:
  - pumping stations
  - valves
  - reinstatement of operations
  - conducting inspections to coincide with low flow in the conduit
  - blocking off flow in a sewer and monitoring backup
  - blocking off flow and bypass pumping.
- Preparation of the conduit and site for inspection*** includes:
- high pressure water jet cleaning to remove surface build-up on the wall of the conduit, roots and or debris
  - locating, exposing, removal and replacement of maintenance hole/pit covers or grates
  - arranging special access requirements, such as:
  - across private land
  - through gates
  - inside buildings
  - construction of platforms for above ground maintenance holes.
- Industry codes and/or specifications*** may include:
- the Conduit Inspection reporting code of Australia WSA 05 2006
  - other codes as nominated by the asset owner, operator or regulator
  - contract specifications for work activity.
- Features of the conduit*** may include:
- structural condition
  - service condition.
- Potential risks to equipment and/or system*** may include:
- loss of camera or equipment due to the condition of the conduit
  - backup of sewage caused by camera or equipment and/or sudden changes in flow.
- Data*** recording may be conducted:
- manually
  - using approved data capture software.
- Conduit evaluation reports*** may comprise:
- videotapes
  - log sheets
  - asset information such as plans, maps, asset location,

## **RANGE STATEMENT**

- number, age and type
- photographs.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## **NWP332B Monitor and control drainage operations**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control drainage systems. The ability to identify faults, gather data, interpret technical information and operate technical equipment are essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with a responsibility for inspecting and reporting faults in drainage systems and for operating, integrating and regulating drainage system processes.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Inspect drainage systems.</b>	<p>1.1 Schedule and conduct routine inspections of <b><i>drainage systems</i></b> and monitor fault reports according to <b><i>organisational and statutory requirements</i></b>.</p> <p>1.2 Collect, analyse and report data on drainage system performance and usage according to organisational and statutory requirements.</p> <p>1.3 Control water sample collecting and recording according to organisational procedures.</p> <p>1.4 Monitor and maintain water according to organisational requirements.</p> <p>1.5 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Regulate flows.</b>	<p>2.1 Inspect <b><i>flow regulating systems</i></b> and apply adjustments necessary to achieve discharge requirements.</p> <p>2.2 Monitor discharge flows and apply diversions required to facilitate repair or emergency.</p>
<b>3 Control and operate processes.</b>	<p>3.1 Control processes to maintain parameters of operation.</p> <p>3.2 Identify, address and report problems and operational conditions of the drainage network according to organisational requirements.</p> <p>3.3 Integrate processes to improve drainage network performance according to organisational requirements.</p>
<b>4. Compile process records.</b>	<p>4.1 Maintain workplace records according to organisational and statutory requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports and logs
- use safety equipment and personal protective equipment
- interpret plans, topographic drawings, charts, service diagrams, service search diagrams and instructions
- interpret policies, standard operating procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- identify control system faults.

#### **Required knowledge:**

- inspection of drainage systems
- coordination processes
- system layout
- system processes
- environmental aspects of drainage systems
- safety procedures
- lock out procedures for mechanical and electrical installations
- policies and standard operating procedures
- procedures and legislation
- relevant utilities and service bodies
- communication systems
- risk factors and potential hazards involved in drainage systems
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of drainage systems
- pipes and fittings
- pumping and valving systems
- gravity systems
- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control drainage systems including:

- monitoring fault reports
- scheduling and conducting inspections
- collecting performance and usage data
- collecting samples
- monitoring water quality
- inspecting and adjusting flow regulating systems
- monitoring discharge flows
- applying diversions as required
- controlling and integrating processes
- identifying and addressing problems
- completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

- Drainage systems*** may include:
- urban and rural locations
  - pumping stations
  - discharge outlets
  - drainage inlets
  - open channel and canal systems.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - equal employment opportunity
  - occupational health and safety, including use of personal protective equipment
  - electrical and mechanical procedures
  - dangerous goods
  - World Health Organisation and National Health and Medical Research Council (NHMRC) guidelines.
- Flow regulating systems*** may include:
- pumping systems
  - valving systems
  - gravity systems
  - emergency overflow and diversion systems
  - metered pits
  - flow chambers
  - control systems.

### Unit Sector(s)

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP333B Monitor and control rural water distribution operations

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor, control and coordinate rural water flow, scheduling and delivery and to report on rural water distribution, including irrigation, domestic and stock supply systems. The ability to identify faults, gather data, interpret technical information and operate technical equipment are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with a responsibility for monitoring and operating rural water distribution systems.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor water delivery system.</b>	<p>1.1 Perform <i>routine inspections</i> of channel flow rates, regulations and delivery according to demand and <i>organisational and statutory requirements</i>.</p> <p>1.2 Gather and record system performance data according to organisational requirements.</p> <p>1.3 Identify and correct system faults according to plans and service standards.</p> <p>1.4 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Control processes.</b>	<p>2.1 Determine and apply system adjustments required to meet demands.</p> <p>2.2 Initiate and coordinate system adjustments required for delivery or channel flow rates according to organisational and demand requirements.</p> <p>2.3 Integrate processes to improve the delivery network performance according to organisational requirements.</p>
<b>3 Analyse data and compile reports.</b>	<p>3.1 Conduct analysis of actual against planned system performance using system data and records.</p> <p>3.2 Compile reports from system performance data according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports and logs
- interpret plans and instructions
- communicate with employees and customers
- control system operations and processes
- use communication equipment
- calculate water flows
- identify control system faults
- lay and join pipes
- install associated fittings and components
- identify and respond to operational problems
- interpret plans, instructions and standard operating procedures
- follow procedures and standards
- use safety equipment and personal protective equipment
- use tools and machinery
- identify hazards
- give and receive instructions.

#### **Required knowledge:**

- inspection of rural distribution systems
- coordination processes
- system layout
- system processes
- environmental aspects of rural distribution systems
- safety procedures
- lock out procedures for mechanical and electrical installations
- policies and standard operating procedures
- procedures and legislation
- relevant utilities and service bodies
- communication systems
- risk factors and potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of rural water distribution systems
- pipes and fittings
- pumping and valving systems
- gravity systems

## **REQUIRED SKILLS AND KNOWLEDGE**

- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, control and coordinate rural water flow, scheduling and delivery including:

- conducting system inspections
- gathering and recording system performance data
- identifying and correcting system faults
- adjusting system to meet demand
- integrating processes
- analysing system performance
- completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Routine inspections*** may include:

- distribution systems, including:
- water mains
- services
- valves
- meters
- associated structures and fittings
- pipes, including:
- polyvinyl chloride (PVC)
- polyethylene
- mild steel cement lined
- ductile iron cement lined
- cast iron
- copper
- glass reinforced piping
- structures, including:
- meter pits
- person access pits
- regulators
- erosion barriers
- head walls
- thrust blocks
- fittings, including:
- jointing systems for pipe types eg gibault
- tapping band
- tension bands
- solvent joins
- compression ring joints
- bolted flanges
- cathodic protection.
- by-laws and organisational policies
- standard operating procedures covering working with:
- lifts and cranes
- mines
- road signage code

***Organisational and statutory requirements*** may include:

## **RANGE STATEMENT**

- electrical sources
- dangerous goods
- environment protection
- occupational health and safety, including the use of personal protective equipment.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP338B Perform infiltration and odour investigations

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to investigate and report on odour and infiltration problems in the wastewater collection and transfer systems. The ability to investigate and resolve wastewater system problems, operate technical equipment and prepare technical reports are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field and operational staff with a specific responsibility for ensuring that odour and infiltration problems in wastewater collection and/or transfer systems are identified and remedied in a safe and timely manner.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for investigation.</b>	<p>1.1 Inspect and select <b><i>tools and equipment</i></b> according to <b><i>organisational and statutory requirements</i></b>.</p> <p>1.2 Schedule regular <b><i>inspections</i></b> according to organisational procedures.</p> <p>1.3 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Investigate and correct odour problems.</b>	<p>2.1 Collect and record wastewater samples according to organisational procedures.</p> <p>2.2 Investigate and report odour sources in the wastewater collection and transfer system according to organisational requirements.</p> <p>2.3 Integrate processes to improve system performance and correct odour problems according to organisational requirements.</p>
<b>3 Investigate and address infiltration problems.</b>	<p>3.1 Manage <b><i>flow regulations</i></b> and determine and undertake diversions and/or isolation of the site to facilitate investigation processes.</p> <p>3.2 Identify address and report illegal inflows or discharges of the wastewater collection and transfer flows according to organisational and statutory requirements.</p>
<b>4 Compile reports and records.</b>	<p>4.1 Review and action investigation results according to organisational and statutory requirements.</p> <p>4.2 Compile reports from wastewater collection and transfer flow data to meet organisational and statutory requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and investigate the source of infiltration and inflows
- investigate illegal inflows and discharges
- investigate odour problems
- identify and correct operational problems
- produce reports, logs, etc.
- use safety equipment and personal protective equipment
- interpret plans, service diagrams, charts and specifications
- interpret policies, standard operating procedures and plumbing and drainage standards
- communicate with employees and customers
- manage system operations and processes
- use communication equipment
- give and receive instructions
- monitor inflows
- operate computerised equipment
- identify control system faults.

#### **Required knowledge:**

- system hydraulics
- monitoring processes
- system layout
- system processes
- systems operation
- isolation procedures
- environmental aspects of wastewater collection systems and infrastructure
- infiltration and inflow sources
- illegal inflows and discharges
- safety procedures
- lock out procedures for mechanical and electrical installations
- policies, standard operating procedures and legislation
- relevant utilities and service bodies
- communication systems
- environment, landscape and ground structure of work area
- risk factors and potential hazards involved in wastewater collection systems equipment operation, capacity and limitations
- effects of weather and conditions on operation of collection infrastructure

## **REQUIRED SKILLS AND KNOWLEDGE**

- pipes and fittings
- pumping and valving systems
- gravity systems
- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to investigate, and report on odour and infiltration problems in the wastewater collection and transfer systems including:

- inspecting and selecting tools and equipment
- scheduling inspections
- collecting and recording wastewater samples
- investigating and reporting odour sources
- integrating processes
- managing flow regulations, diversions and isolation of the site
- identifying, addressing and reporting illegal inflows or discharges
- reviewing and addressing investigation results
- completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's

## EVIDENCE GUIDE

competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Tools and equipment*** may include:

- electronic monitoring and metering systems
- gas detection equipment
- sampling and testing equipment
- infiltration dye testing equipment
- smoke testing equipment
- closed circuit television
- manual chart recording systems
- on- and off-road vehicles
- communication equipment
- marine craft
- breathing apparatus
- atmosphere monitoring equipment
- rescue equipment
- appropriate personal protective equipment
- computerised equipment.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- equal employment opportunity
- occupational health and safety
- plumbing and drainage standards
- Water Acts
- electrical and mechanical procedures
- hazardous substances and dangerous goods
- World Health Organisation and National Health and Medical Research Council (NHMRC) guidelines.

***Inspections*** may require:

- investigation of:
- trade waste admission
- on-site pre-treatment systems
- air scrubbers
- grease traps
- separators and arresters
- illegal connections
- infiltration sources

## RANGE STATEMENT

- Flow regulations* may require:
- interaction and communication with other employees, plumbing and drainage consultants, other authorities and the general public
  - visual and electronic inspections
  - condition monitoring of assets
  - implementation of reporting procedures that may also include:
    - procedures for the implementation of by-laws
    - organisational policies
    - standard operating procedures
    - statutory requirements.
  - the adjustment of:
    - pumping systems
    - valving systems
    - electronic and manual control systems
    - gravity systems.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

## NWP339B Perform leak detection

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to plan leak detection activities and to locate, identify and report leaks in water distribution networks (pressure mains).

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for field staff with a specific responsibility for planning and implementing leak detection activities according to organisational and statutory requirements.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan for leak detection.</b>	<p>1.1 Determine work site boundaries and <i>leak detection requirements</i> from plans, specifications and instructions.</p> <p>1.2 Select and check <i>equipment</i> according to <i>organisational and statutory requirements</i>.</p> <p>1.3 Use site inspection and service search diagrams according to work site requirements.</p>
<b>2 Operate leak detection equipment.</b>	<p>2.1 Determine and mark work site boundaries from plans and service search diagrams.</p> <p>2.2 Select, fit and correctly use personal protective equipment.</p> <p>2.3 Operate leak detection equipment according to organisational and statutory requirements.</p> <p>2.4 Mark the location of leaks according to organisational requirements.</p> <p>2.5 Expose leaks and arrange repair according to testing outcomes and organisational and statutory requirements.</p>
<b>3 Review, record and report work.</b>	<p>3.1 Review and record work according to organisational requirements.</p> <p>3.2 Compile reports according to organisational requirements.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- use leak detection equipment
- identify and correct problems
- regulate systems and flows
- use basic mathematics for calculation and measurement
- collect data
- analyse data to take remedial action
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- interpret plans, specifications, policies and procedures
- provide maintenance records for equipment
- communicate with employees, other service providers and customers
- use communication systems
- give and receive instructions
- identify safety risks and hazards.

#### Required knowledge:

- identification and repair procedures
- system hydraulics
- system layout
- environmental aspects
- lock out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- landscape and ground structure of work area
- risk assessment and the identification of potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on site or plant.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to plan leak detection activities and to locate, identify and report leaks in water distribution networks including:

- planning leak detection activities
- operating leak detection equipment safely
- locating and marking leaks and arranging repair activities
- completing documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

## EVIDENCE GUIDE

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Leak detection requirements*** may include:
- location of leaks in pipes, including:
    - polyvinyl chloride (PVC)
    - reinforced concrete
    - polyethylene
    - cast iron cement lined
    - ductile iron cement lined
    - asbestos cement
    - mild steel cement lined
  - location of leaks in fittings, including:
    - jointing systems for pipe types eg gibault
    - tension bands
    - solvent cement joints
    - compression ring joints
    - bolted flanges
    - cathodic protection
    - electrofusion
    - butt-welding
  - location of leaks in structures, including:
    - meter pits
    - valve pits
    - drop structures
    - regulators
    - erosion barriers
    - head walls
    - thrust blocks,
    - inspection shafts
  - regulation of flow and pressure, including:
    - the adjustment of pumping systems
    - valving systems
    - gravity flow systems
    - service reservoirs
    - electronic and manual control systems.
- Equipment*** used may
- leak detection equipment
  - pipe and cable locating equipment



## **RANGE STATEMENT**

include:

- hand and power tools
- lifting equipment
- mechanical excavation equipment
- pneumatic and motorised equipment (eg compressors, pneumatic spades and attachments)
- motorised cutting equipment
- on- and off-road vehicles
- portable pumps
- communication systems
- gas detection equipment
- rescue equipment
- appropriate personal protective equipment.
- by-laws or organisational policies
- procedures
- environment protection
- occupational health and safety
- mines and subsidence
- road signage
- electrical safety
- dangerous goods
- manufacturer's guidelines.

*Organisational and statutory requirements* may include:

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## **NWP340A Measure and process hydrometric stream discharge data using wading gaugings**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to collect hydrometric stream discharge data using wading gaugings. An understanding of risk assessment and factors affecting the accuracy and precision of the area-velocity method are essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for hydrographers, field hydrologists and related staff.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare to collect hydrometric stream gauging data.</b>	<p>1.1 Identify, analyse and confirm the <i>data collection regime</i> required by the organisation.</p> <p>1.2 Select appropriate <i>testing equipment</i> and confirm its calibration and maintenance status in accordance with organisational procedures.</p> <p>1.3 Evaluate <i>site conditions</i> and prepare for the taking of measurements in accordance with <i>organisational procedures and relevant industry standards</i>.</p> <p>1.4 Select the cross-section for discharge measurement.</p>
<b>2 Collect depth and velocity data.</b>	<p>2.1 Accurately measure the width of the section.</p> <p>2.2 Select appropriate sounding points (verticals) to subdivide the cross-section.</p> <p>2.3 Accurately measure the depth of vertical.</p> <p>2.4 Select the appropriate measurement equipment to suit the ambient conditions.</p> <p>2.5 Collect velocity data at appropriate depth(s) for each vertical.</p>
<b>3 Calculate discharge.</b>	<p>3.1 Calculate the point velocity.</p> <p>3.2 Calculate the mean velocity for each vertical.</p> <p>3.3 Calculate the area of sub-section corresponding to each vertical.</p> <p>3.4 Calculate the discharge corresponding to each sub-section.</p> <p>3.5 Calculate the area and discharge at the section by summation of the sub-section data.</p> <p>3.6 Apply corrections for oblique flow as required.</p>
<b>4 Complete recording and reporting requirements for discharge measurement.</b>	<p>4.1 Gather <i>relevant supporting information</i> from the site and accurately complete documentation in accordance with organisational procedures.</p> <p>4.2 Calculate and record the mean stage height and rate of change using relevant <i>mathematical techniques</i>.</p> <p>4.3 Grade and record the gauging quality.</p> <p>4.4 Check records in accordance with organisational procedures.</p> <p>4.5 Enter gauging into ratings database in accordance with organisational procedures.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- assesses risks and takes appropriate precautions/actions
- maintains testing equipment in good order and calibration
- interpret and apply technical documentation
- use surveying equipment to identify site location
- perform basic mathematical calculations (addition, subtraction, multiplication, division, rounding)
- use safety equipment and personal protective equipment appropriately
- identify potential or actual operational problems
- communicate with employees and customers
- use computer systems
- use communication systems
- give and receive instructions.

#### **Required knowledge:**

- performance and limitations of the monitoring systems and sites employed in monitoring the network/catchment
- principle of area-velocity measurement of discharge
- turbulent and laminar flow
- testing procedures
- occupational health and safety procedures
- policies and standard operating procedures
- communication systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to collect hydrometric stream discharge data using wading gaugings including:

- gathering, interpreting and applying complex documentation related to the specification of hydrographic data collection and reporting procedures
- collecting sample accurately
- analysing and verifying data using standard procedures, software and databases
- preparing clear and accurate reports
- storing and archiving data
- identifying, reporting and (within scope of job function) solving potential or actual problems.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

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experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Data collection regime*** may include:
- performance agreements
  - quality assurance
  - catchment gauging sites
  - work schedules
  - work priorities
  - procedures, codes and standards.
- Testing equipment*** may include:
- surveying equipment (staffs, levels, GPS, EDM, measuring tapes)
  - stage measurement devices (gauge boards, submersible pressure transducer, gas-purge systems, shaft encoder, radar)
  - mechanical current meters
  - meter rods
  - electronic counters
  - Acoustic Doppler Velocity meters.
- Site conditions*** may include:
- gauge height
  - debris
  - conditions affecting safety
  - turbulence
  - angled flow
  - wind
  - aquatic growth.
- Organisational procedures and relevant industry standards*** may include:
- Standards relevant to the monitoring network including AS 3778 for water measurement installations, WMO/Bureau of Meteorology guidelines for siting of meteorological sensors and systems and best practice methodology where standards are not available or applicable
  - water data base management software for triggering alarms, notifications, advice to relevant authorities and management for actions
  - instrument calibration
  - procedures for discharge measurement in open channels using mechanical current meters (waded gaugings, flood gaugings by cableways/travellers/boats)



## RANGE STATEMENT

- procedures for data logging (programming, interrogation, data downloading, data security)
  - procedures for the measurement of surface slopes and flood slopes
  - procedures for the development, maintenance and extension of rating curves.
  - location of section
  - personnel details
  - details of any clearing of the section undertaken
  - details of testing equipment used
  - date and time
  - floating debris
  - gauge heights
  - the quality of the gauging
  - photographic record
  - sketch.
  - conversion of units
  - graphical analysis
  - calculation of point velocity using ratings for mechanical current meters.
- Relevant supporting information* may include:
- Mathematical techniques* that may be used include:

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Hydrography

## **NWP342A Commission, decommission and monitor hydrometric sites, stations and facilities**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to commission, decommission and monitor hydrometric sites, stations and facilities to organisational standards. The ability to interpret and apply technical specifications and undertake the commissioning of sites to support the collection of hydrometric data are central to successful performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for hydrographers and related staff.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan the commissioning of hydrometric sites, stations and facilities.</b>	<ul style="list-style-type: none"><li>1.1 Identify and confirm the commissioning procedures for the site, station or facility.</li><li>1.2 Identify the <i>monitoring</i> requirements supported by the site, station or facility.</li><li>1.3 Conduct site investigations and surveys in accordance with organisational procedures in order to select appropriate sites.</li><li>1.4 Prepare plans for the commissioning or decommissioning of the site, station or facility and secure appropriate authorisation.</li></ul>
<b>2 Commission hydrometric sites, stations and ancillary facilities.</b>	<ul style="list-style-type: none"><li>2.1 Identify, assemble and check the <i>equipment</i> required for the task prior to use.</li><li>2.2 Prepare the site, station or facility according to the work plan and in accordance with <i>organisational standards and safe work practices</i>.</li><li>2.3 Commission and register hydrometric stations and ancillary infrastructure.</li><li>2.4 Complete records of the commissioning process in accordance with organisational procedures.</li></ul>
<b>3 Support hydrometric data collection.</b>	<ul style="list-style-type: none"><li>3.1 Apply instrument and site maintenance schedules.</li><li>3.2 Apply testing schedules.</li><li>3.3 Put in place processes to monitor instrument performance and take corrective action as required in accordance with organisational and industry standards.</li><li>3.4 Maintain test records in accordance with organisational requirements.</li><li>3.5 Compile and store reports and documentation according to organisational requirements.</li></ul>
<b>4 Decommission and restore hydrometric sites.</b>	<ul style="list-style-type: none"><li>4.1 Demolish or decommission structures in accordance with organisational standards and safe work practices.</li><li>4.2 Restore sites in accordance with organisational standards, safe work practices and environmental requirements.</li><li>4.3 Identify and address potential or actual problems and report to appropriate personnel.</li></ul>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- interprets and applies technical documentation to commissioning and decommissioning of hydrometric sites, stations and facilities
- applies construction and mechanical skills to the effective commissioning and decommissioning of hydrometric sites, stations and facilities
- uses appropriate work practices to minimise environmental impact of the commissioning and decommissioning process
- uses safety equipment and personal protective equipment appropriately
- uses hand and power tools and other relevant equipment effectively and safely
- identifies potential or actual operational problems
- conducts inspections
- produces reports
- reads and interprets plans, specifications, maps and job instructions
- communicates with employees and customers
- uses communication systems
- gives and receives instructions
- applies skills specific to the industry and for working safely in remote locations including:
  - remote area survival
  - water safety
  - high voltage work
  - hazardous environments.

#### Required knowledge:

- mathematics, atmospheric physics and hydrology relevant to the role
- operating parameters, processes and capacity limitations of hydrometric sites, stations and facilities
- risk factors and potential hazards involved with commissioning and decommissioning sites, stations and facilities
- occupational health and safety procedures
- policies and standard operating procedures
- relevant utilities and service bodies
- communication systems
- Standards relevant to the installation tasks including:
  - AS 3778 for water measurement installations
  - WMO / Bureau of Meteorology guidelines for siting of meteorological sensors and systems
- application of best practice methodology where standards not applicable or available

## **REQUIRED SKILLS AND KNOWLEDGE**

- relevant construction standards and codes (Federal, State and Local).

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to commission, decommission and monitor hydrometric sites, stations and facilities including:

- gathering, interpreting and applying construction and technical documentation related to the commissioning and decommissioning of hydrometric sites, stations and facilities
- commissioning hydrometric sites, stations and facilities
- closely adhering to organisational and industry standards for the testing and monitoring of instruments
- preparing clear and accurate reports
- working safely
- minimising environmental impacts from the commissioning and decommissioning process
- identifying, reporting and (within scope of job function) solving potential or actual problems.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

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assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Monitoring*** is conducted for a range of data collection purposes including:

- stage and discharge
- surface water and ground water measurement, assessment and management
- snow pack measurement
- estuarine monitoring
- water quality
- other purposes relevant to the specific requirements of the monitoring site.

***Equipment*** required for installation and maintenance may include:

- personal protective equipment
- hand and power tools
- portable power supplies
- computer equipment
- pumping equipment
- test equipment
- communications equipment
- signage
- 4WD vehicles
- bore drilling rig
- surveying equipment (staffs, levels, GPS, EDM).

***Organisational standards and safe work practices*** may include reference to:

- by-laws and organisational policies
- standard operating procedures
- environment protection standards and requirements
- occupational health and safety standards and requirements, including use of personal protective equipment
- safe handling of hazardous substances
- appropriate use of road and worksite signage.

The compilation of ***reports and documentation*** requires:

- rigorous application of appropriate industry standards for the collection and reporting of data
- the application of knowledge appropriate to the task across a broad range of areas including hydrology, physics and mathematics to ensure appropriate and accurate analysis and reporting of hydrometric data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Hydrography

# NWP345B Monitor, operate and control water treatment processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to perform basic monitoring, operation, control and measurement of water treatment plant processes and to report on water treatment plant system performance and process quality control.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff that may be required to perform monitoring, operation and control of water treatment plant, as an additional and occasional part of their normal job role.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor treatment plant performance.</b>	<p>1.1 Carry out <b><i>routine plant inspections</i></b> according to the type of plant and <b><i>organisational procedures and statutory requirements</i></b>.</p> <p>1.2 Select and check <b><i>equipment</i></b> and correctly fit and use personal protective equipment.</p> <p>1.3 Collect water and other process samples and conduct standard <b><i>tests</i></b>.</p> <p>1.4 Collect, record and report process data according to organisational and plant requirements.</p>
<b>2 Prepare chemical dosing.</b>	<p>2.1 Use, handle and store <b><i>chemicals</i></b> according to organisational procedures and statutory requirements.</p> <p>2.2 Determine and prepare chemical dosing according to plant procedures and statutory requirements.</p> <p>2.3 Maintain information related to chemical supply and usage according to organisational procedures and statutory requirements.</p>
<b>3 Operate and control processes.</b>	<p>3.1 Conduct chemical dosing according to organisational procedures and statutory requirements.</p> <p>3.2 Identify and report <b><i>process</i></b> faults and the operational condition of plant according to organisational procedures and statutory requirements.</p> <p>3.3 Initiate basic <b><i>system adjustments</i></b> to improve system performance according to organisational procedures and statutory requirements.</p>
<b>4 Compile process records.</b>	<p>4.1 Compile reports from plant and system data to meet organisational procedures and statutory requirements.</p> <p>4.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- perform process calculations
- produce reports and logs
- use safety equipment and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and customers
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- prepare and apply chemical dosing
- operate computerised equipment
- identify control system faults
- sample and test products.

#### **Required knowledge:**

- system hydraulics
- system layout
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- environmental, landscape and ground structure of work area
- risk factors and potential hazards associated with the operation of water treatment processes
- chemical dosing processes
- process calculations
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pumping and valving systems
- mechanical and electrical control systems
- policies and procedures for storing and handling dangerous goods and chemicals
- interpretation and use of material safety data sheets
- chemical and biological principles that form the basis of water treatment.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to perform basic monitoring, operation, control and measurement of water treatment plant processes including:

- conducting routine plant inspections, taking samples and performing basic tests
- preparing and applying chemical dosing according to instructions
- identifying and reporting system faults
- making basic system adjustments according to instructions
- completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Routine plant inspections*** may include:

- visual observation of:
- raw water
- floc formation
- sedimentation
- filtration
- filtered water
- dosing equipment
- interaction and communication with other employees, other authorities and the general public
- implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.

***Organisational procedures and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- occupational health and safety
- chemicals
- dangerous goods
- electrical
- lifts and cranes
- World Health Organisation standards
- Australian Drinking Water Guidelines
- licensing agreements.

***Equipment*** may include:

- electronic monitoring and metering systems
- chart recording systems
- basic hand tools
- sampling and laboratory testing equipment
- computerised equipment
- communication equipment
- personal protective equipment.

***Tests*** may include:

- testing of raw, clarified, filtered and finished water for:
- turbidity
- colour
- pH



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- finished water should be tested for chlorine residual
  - other tests may include:
    - hardness
    - alkalinity
    - routine jar testing.
- Chemicals* may include:
- chlorine gas
  - sodium hypochlorite
  - calcium hypochlorite
  - carbon dioxide
  - alum
  - powder activated carbon
  - polymers
  - lime.
- Processes* may include:
- pre-treatment, for example:
    - screen systems
    - lime
    - chlorination
  - chemical addition, for example:
    - coagulation
    - flocculation
    - flash-mixing
  - solids separation, for example:
    - sedimentation
    - flotation
    - filtration
    - membrane processes
  - disinfection, for example:
    - chlorination
    - ozonation
    - chloramination
  - post-treatment, for example:
    - fluoridation.
- System adjustments* may include:
- dosing adjustments
  - pH correction.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

# NWP346B Monitor, operate and control wastewater treatment processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to perform basic monitoring, operation, control and measurement of wastewater treatment plant and report on system performance and process quality control.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff that may be required to perform monitoring, operation and control of wastewater treatment plant, as an additional and occasional part of their normal job role.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor treatment plant performance.</b>	<p>1.1 Carry out <b><i>routine plant inspections</i></b> according to the type of plant and <b><i>organisational and statutory requirements</i></b>.</p> <p>1.2 Select and check <b><i>equipment</i></b> and correctly fit and use personal protective equipment.</p> <p>1.3 Collect process samples and conduct standard <b><i>tests</i></b>.</p> <p>1.4 Collect process data and report according to organisational and plant requirements.</p>
<b>2 Prepare and apply chemical dosing.</b>	<p>2.1 Use, handle and store <b><i>chemicals</i></b> according to organisational and statutory requirements.</p> <p>2.2 Prepare chemical dosing according to plant processes and organisational and statutory requirements.</p> <p>2.3 Maintain information related to chemical supply and usage according to statutory requirements.</p>
<b>3 Operate and control processes.</b>	<p>3.1 Monitor <b><i>processes</i></b> to maintain the parameters of operation.</p> <p>3.2 Identify and report process faults and the operational condition of plant according to organisational and statutory requirements.</p> <p>3.3 Carry out basic <b><i>system adjustments</i></b> to enhance system performance according to organisational and statutory requirements.</p>
<b>4 Compile process records.</b>	<p>4.1 Compile <b><i>records</i></b> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>4.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- perform process calculations
- produce reports and logs
- use safety equipment and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and various customers
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- prepare and apply chemical dosing
- operate computerised equipment
- identify control system faults
- sample and test products.

#### **Required knowledge:**

- system layout
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- environment, landscape and ground structure of work area
- risk factors and potential hazards related to wastewater treatment
- chemical dosing processes
- system calculations
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pumping and valving systems
- control systems' policies and procedures for storing and handling dangerous goods and chemicals
- interpretation and use of material safety data sheets
- chemical and biological principles that form the basis of wastewater treatment.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control routine aspects of wastewater treatment processes, including:

- conducting routine plant inspections
- taking samples and performing basic tests
- preparing and applying chemical dosing according to instructions
- identifying and reporting system faults
- making allowed system adjustments according to instructions
- completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Routine plant inspections*** may include:

- interaction and communication with other employees, other authorities and the general public
- visual observation
- identification of corrosion damage
- implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- occupational health and safety
- chemicals
- dangerous goods
- lifts and cranes
- Environment Protection Authority regulations
- licensing agreements
- electrical standards.

***Equipment used*** may include:

- electronic monitoring and metering systems
- manual chart recording systems
- basic hand tools
- sampling and laboratory testing equipment
- computerised equipment
- on- and off-road vehicles
- communication equipment
- personal protective equipment.

***Tests*** may include:

- settling tests
- microscopic observation
- pH
- temperature
- dissolved oxygen
- chlorine residuals
- ammonia, nitrate, reactive phosphorus and alkalinity determinations.



## RANGE STATEMENT

*Chemicals* may include:

- chlorine gas
- sodium hypochlorite
- calcium hypochlorite
- carbon dioxide
- alum
- powder activated carbon
- polymers
- lime.

*Processes* may include:

- pre-treatment, for example:
- screening
- shredding
- grit removal
- odour removal
- primary treatment, for example:
- primary sedimentation
- secondary treatment, for example:
- trickling filters
- rotating biological contactors
- activated sludge
- lagoon system
- chemical precipitation
- solids handling, for example:
- aerobic or anaerobic digesters
- sludge disposal
- disinfection, for example:
- maturation ponds
- chlorination
- ultraviolet irradiation
- ozonation
- advanced treatment, for example:
- chemical nitrogen removal
- biological nitrogen removal
- biological phosphorus removal
- chemical phosphorous removal
- micro filtration.
- pH correction
- dissolved oxygen levels
- additional carbon source
- variations of run times of equipment.

*System adjustments* may include:

## **RANGE STATEMENT**

*Records* may include:

- plant performance data
- chemical usage.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# **NWP347B Monitor, operate and control coagulation and flocculation processes**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control coagulation and flocculation plant; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments, conduct chemical dosing procedures and produce technical reports are essential to performance.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that coagulation and flocculation processes in water treatment plants conform to organisational standards and comply with statutory requirements.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

### Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor coagulation and flocculation plant performance.</b>	<p>1.1 Monitor test results and <i>processes</i> to ensure compliance with the parameters of the operation.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <i>organisational and statutory requirements</i>.</p>
<b>2 Control chemical use.</b>	<p>2.1 Use, handle and store <i>chemicals</i> according to organisational procedures and statutory requirements.</p> <p>2.2 Determine and apply chemical dosing according to plant processes, organisational procedures and statutory requirements.</p> <p>2.3 Maintain chemical supply and usage records according to statutory requirements.</p>
<b>3 Operate and control coagulation and flocculation processes.</b>	<p>3.1 Carry out <i>routine plant inspections</i> according to organisational and plant requirements.</p> <p>3.2 Collect process samples and conduct standard <i>tests</i>.</p> <p>3.3 Carry out <i>system adjustments</i> and <i>process calculations</i> to improve system performance according to organisational procedures and statutory requirements.</p>
<b>4 Compile coagulation and flocculation process records.</b>	<p>4.1 Compile <i>reports</i> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>4.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct operational and control system problems
- take samples and perform tests
- produce logs and reports
- perform process calculations
- prepare and apply chemical dosing
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- give and receive instructions
- operate control and communication systems
- use safety and personal protective equipment
- communicate with employees and customers.

#### **Required knowledge:**

- process layout
- features and components of coagulation and flocculation systems
- theory of process operations
- chemicals used for coagulation and flocculation
- chemical dosing processes
- risk factors and potential hazards related to coagulation and flocculation systems
- risk control requirements including safety equipment and material safety data sheets
- lockout procedures for mechanical and electrical installations and hydraulic isolation
- equipment operation, capacity and limitations
- operation of pumping and valving systems
- control and communications systems
- policies, procedures and relevant legislation
- water testing procedures
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pumping and valving systems
- procedures for storing and handling dangerous goods and chemicals
- interpretation of material safety data sheets
- chemical and biological principles that form the basis of coagulation and flocculation processes.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control coagulation and flocculation processes, including:

- conducting routine plant inspections, taking samples and performing basic tests
- preparing and applying chemical dosing according to instructions
- identifying and reporting system faults
- making basic system adjustments according to instructions
- completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Processes*** may include:
- chemical addition
  - flash mixing
  - flocculation.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - occupational health and safety, including use of personal protective equipment
  - chemicals
  - dangerous goods
  - lifts and cranes
  - World Health Organisation standards
  - Australian Drinking Water Guidelines
  - National Water Quality Management strategy
  - Environment Protection Authority regulations
  - licensing agreements
  - electrical standards.
- Chemicals*** may include:
- aluminium and iron based coagulants
  - synthetic organic polymers
  - pH adjusting chemicals such as lime, soda ash, caustic soda.
- Routine plant inspections*** may require:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - identification of corrosion damage
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements
  - use of equipment, including:
    - electronic monitoring and metering systems
    - manual chart recording systems
    - basic hand tools
    - sampling and laboratory testing equipment
    - computerised equipment



## RANGE STATEMENT

- Tests* may include:
- communication equipment
  - personal protective equipment.
  - flocculation growth
  - flocculation time
  - mixing time
  - mixing energy
  - pH
  - colour
  - turbidity
  - routine jar tests
  - residual aluminium or iron.
- System adjustments* may include:
- pH correction
  - chemical dosing.
- Process calculations* may include:
- preparation of dosing solutions
  - jar test dosages
  - dry and liquid chemical feed rates
  - mixing intensity.
- Reports* may include:
- plant performance data
  - chemical usage.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

# **NWP348B Monitor, operate and control sedimentation and clarification processes**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control sedimentation and clarification plant; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments, conduct chemical dosing procedures and produce technical reports are essential to performance.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that sediment and clarification processes in water treatment plants conform to organisational standards and comply with statutory requirements.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor sedimentation and clarification plant performance.</b>	<p>1.1 Monitor test results and <i>processes</i> to maintain the parameters of operation.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <i>organisational and statutory requirements</i>.</p>
<b>2 Control chemical use.</b>	<p>2.1 Use, handle and store chemicals according to organisational procedures and statutory requirements.</p> <p>2.2 Prepare and apply chemical dosing according to plant processes and organisational procedures and statutory requirements.</p> <p>2.3 Maintain chemical supply and usage records according to statutory requirements.</p>
<b>3 Operate and control sedimentation and clarification processes.</b>	<p>3.1 Carry out <i>routine plant inspections</i> according to organisational and plant requirements.</p> <p>3.2 Collect process samples and conduct standard <i>tests</i>.</p> <p>3.3 Perform <i>process calculations</i> associated with sedimentation and clarification processes.</p> <p>3.4 Carry out <i>system adjustments</i> to enhance system performance according to organisational procedures and statutory requirements.</p>
<b>4 Compile sedimentation and clarification process records.</b>	<p>4.1 Compile reports from plant and system data to meet organisational and statutory requirements.</p> <p>4.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct operational problems
- produce reports and logs
- use safety and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and various customers
- perform process calculations
- use communication equipment
- give and receive instructions
- prepare and apply chemical dosing
- operate computerised equipment
- identify control system faults
- sample and test products.

#### **Required knowledge:**

- system layout
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- settling aids
- hazardous materials handling
- environment, landscape and ground structure of work area
- risk factors and potential hazards related to water and/or wastewater treatment
- chemical dosing processes
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pumping and valving systems
- control systems' policies and procedures for storing and handling dangerous goods and chemicals
- interpretation of material safety data sheets
- chemical and/or biological principles that form the basis of sedimentation and clarification processes.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control sedimentation and clarification processes, including:

- conducting routine plant inspections
- taking samples and performing basic tests
- preparing and applying chemical dosing according to instructions
- identifying and reporting system faults
- making basic system adjustments according to instructions
- completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Processes*** may include:
- sludge blanket clarifiers
  - conventional clarifiers
  - tube settlers
  - high rate plate settlers
  - recirculating contact clarifiers
  - pulsator clarifiers
  - ballasted sedimentation.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - Australian Drinking Water Guidelines
  - National Water Quality Management strategy
  - environment protection
  - occupational health and safety, including use of personal protective equipment
  - chemicals
  - dangerous goods
  - lifts and cranes
  - World Health Organisation standards
  - Environment Protection Authority regulations
  - licensing agreements
  - electrical standards.
- Routine plant inspections*** may include:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - identification of corrosion damage
  - the use of equipment, including:
    - electronic monitoring and metering systems
    - recording systems
    - basic hand tools
    - sampling and laboratory testing equipment
    - control equipment
    - communication equipment
    - personal protective equipment.

## **RANGE STATEMENT**

*Tests* may include:

- settling velocity tests
- pH
- jar tests
- turbidity and solids concentration (% v/v).

*Process calculations* may include:

- tank volumes
- weir overflow rates
- detention times
- rise rates
- surface loading rates
- settling velocity
- calculations associated with sludge settling tests.

*System adjustments* may include:

- pH correction
- chemical addition
- sludge withdrawal rates
- recirculation rates
- flow rates.

*Reports* may include:

- plant performance data
- chemical usage.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment



# NWP349B Monitor, operate and control incineration processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control incineration plant and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments and produce technical reports are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that incineration processes in water treatment plants conform to organisational standards and comply with statutory requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor incineration plant performance.</b>	<p>1.1 Monitor test results and combustion processes to meet organisational procedures and statutory requirements.</p> <p>1.2 Identify and report process faults and the operational condition of <b><i>plant</i></b> according to <b><i>organisational and statutory requirements</i></b>.</p> <p>1.3 Select and check <b><i>equipment</i></b> and correctly fit and use personal protective equipment.</p>
<b>2 Operate and control processes.</b>	<p>2.1 Carry out <b><i>routine plant inspections</i></b> according to organisational and plant requirements.</p> <p>2.2 Conduct and analyse process <b><i>tests</i></b> and compare performance to operational requirements.</p> <p>2.3 Make <b><i>system adjustments</i></b> to improve system performance according to organisational and statutory requirements.</p> <p>2.4 Collect, interpret and record process data and report according to organisational and plant requirements.</p>
<b>3 Compile process records.</b>	<p>3.1 Compile <b><i>reports</i></b> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports, logs, etc.
- use safety equipment and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- determine chemical dosing requirements
- operate computerised equipment
- identify control system faults
- sample and test products.

#### **Required knowledge:**

- coordination processes
- system layout
- system processes
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- environmental aspects of wastewater treatment
- risk factors and potential hazards involved with chemical usage
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pipes and fittings
- pumping and valving systems
- mechanical and electrical control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control incineration processes, including:

- conducting routine plant inspections
- taking samples and performing basic tests
- preparing and applying incineration processes according to instructions
- identifying and reporting system faults
- making basic system adjustments according to instructions
- completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Plant*** may include:

- furnace feed conveyors
- furnace equipment
- combustion fans and equipment
- auxiliary fuel system
- ash transfer system
- ash disposal system
- furnace exhaust gas scrubbers.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- occupational health and safety
- Australian Drinking Water Guidelines
- National Water Quality Management strategy
- chemicals
- dangerous goods
- lifts and cranes
- Environment Protection Authority regulations
- licensing agreements
- electrical.

***Inspection*** may include:

- inspection of:
  - fluidised furnaces
  - co-fired furnaces
  - fixed bed furnaces
- use of equipment, including:
  - electronic monitoring and metering systems
  - manual chart recording systems
- basic hand tools
- sampling and laboratory testing equipment
- computerised equipment
- communication equipment
- personal protective equipment
- interaction and communication with other employees, other authorities and the general public
- visual observation

## **RANGE STATEMENT**

- implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.
- Tests* may include:
- water content
  - flame temperature
  - fuel to air ratios.
- System adjustments* may include:
- loading rates
  - centrifuge settings
  - burner operation
  - feed rate adjustments
  - air ratio.
- Reports* may include:
- plant performance data
  - environmental reports
  - centrifuge performance data
  - chemical usage.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# NWP350B Monitor, operate and control trickling filter processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control fixed film aerobic bioreactor processes, such as trickling filters and rotating biological contactors. This unit of competency also describes the outcomes required to measure and report on system performance and process quality control.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that fixed film aerobic bioreactor processes, such as trickling filters and rotating biological contactors comply with organisational and statutory requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 <b>Monitor fixed film aerobic bioreactor process performance.</b>	<p>1.1 Monitor test results and <b><i>processes</i></b> according to <b><i>organisational and statutory requirements</i></b></p> <p>1.2 Identify and report faults and the operational condition of the process according to organisational procedures and statutory requirements.</p>
2 <b>Operate and control fixed film aerobic bioreactor processes.</b>	<p>2.1 Select and check <b><i>equipment</i></b> and correctly fit and use personal protective equipment.</p> <p>2.2 Carry out <b><i>routine plant inspections</i></b> according to the type of plant and organisational and statutory requirements.</p> <p>2.3 Collect process samples and conduct standard <b><i>tests</i></b>.</p> <p>2.4 Carry out <b><i>system adjustments</i></b> and <b><i>process calculations</i></b> to enhance system performance according to organisational and statutory requirements.</p> <p>2.5 Collect, interpret and record process data according to organisational and plant requirements.</p>
3 <b>Compile fixed film aerobic bioreactor process records.</b>	<p>3.1 Compile <b><i>reports</i></b> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify and correct operational and control system problems
- take samples and perform tests
- produce logs and reports
- determine chemical dosing requirements
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- give and receive instructions
- operate control and communication systems
- use safety and personal protective equipment
- perform relevant process calculations
- use safety and personal protective equipment
- communicate with employees and customers
- work effectively as part of a team
- operate computerised equipment.

#### Required knowledge:

- process layout
- features and components of fixed film aerobic bioreactor systems
- theory of process operation and monitoring
- chemicals used for pH control, odour control, nutrients
- flow measurement
- risk factors and potential hazards related to fixed film aerobic bioreactor systems
- risk control requirements including safety equipment and material safety data sheets
- lockout procedures for mechanical and electrical installations and hydraulic isolation
- equipment operation, capacity and limitations
- operation of pumping and valving systems
- control and communications systems
- policies, procedures and relevant legislation
- relevant utilities and service bodies
- process calculation
- hazardous materials handling
- interpretation of material safety data sheets
- chemical and biological principles that form the basis of fixed film aerobic wastewater treatment
- types of fixed film processes
- recirculation principles

## **REQUIRED SKILLS AND KNOWLEDGE**

- operational problems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control fixed film processes including:

- monitoring test results
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Processes*** may include:
- fixed film aerobic treatment processes, such as:
  - trickling filters
  - rotating biological contactors.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines
  - environment protection
  - occupational health and safety, including the correct use of personal protective equipment
  - chemicals
  - dangerous goods
  - lifts and cranes
  - Environment Protection Authority regulations
  - licensing agreements
  - electrical standards.
- Equipment*** may include:
- electronic monitoring and metering systems
  - chart recording systems
  - basic hand tools
  - sampling and laboratory testing equipment
  - computerised equipment
  - communication equipment
  - personal protective equipment.
- Routine plant inspections*** may include:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - identification of corrosion damage
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.
- Tests*** may include:
- settling tests
  - microscopic observation
  - pH
  - dissolved oxygen

## RANGE STATEMENT

- nutrient analyses, such as:
    - nitrogen
    - phosphorus
    - temperature.
  - pH correction
  - dissolved oxygen levels
  - recirculation rates.
  - hydraulic and organic loading rates
  - recirculation ratios.
  - plant performance data
  - chemical usage.
- System adjustments* may include:
- Process calculations* may include:
- Reports* may include:

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

## **NWP351B Monitor, operate and control activated sludge processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control activated sludge processes including derivatives such as IDEA and SBR processes, Bathurst box processes and oxidation ditches. This unit also describes the outcomes required to measure and report on activated sludge process performance and quality control.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that activated sludge processes including derivatives such as IDEA and SBR processes, Bathurst box processes and oxidation ditches, comply with organisational and statutory requirements.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.



## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

### Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor activated sludge process performance.</b>	<p>1.1 Monitor test results and <i>processes</i> to meet <i>organisational and statutory requirements</i>.</p> <p>1.2 Identify and report faults and the operational condition of the process according to organisational procedures and statutory requirements.</p>
<b>2 Operate and control activated sludge processes.</b>	<p>2.1 Select and check <i>equipment</i> and correctly fit and use personal protective equipment.</p> <p>2.2 Carry out <i>routine plant inspections</i> according to the type of plant and organisational requirements.</p> <p>2.3 Collect process samples and conduct standard <i>tests</i>.</p> <p>2.4 Carry out <i>system adjustments</i> and <i>process calculations</i> to enhance system performance according to organisational procedures and statutory requirements.</p> <p>2.5 Collect and report process data according to organisational and plant requirements.</p>
<b>3 Compile process records.</b>	<p>3.1 Compile <i>reports</i> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify and correct operational and control system problems
- take samples and perform tests
- produce logs and reports
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- give and receive instructions
- determine chemical dosing requirements
- operate control and communication systems
- use safety and personal protective equipment
- perform process related calculations
- use safety and personal protective equipment
- communicate with employees and various customers
- work effectively as part of a team
- operate computerised equipment
- take samples and conduct tests.

#### Required knowledge:

- process layout
- features and components of activated sludge systems
- theory of process operation and monitoring
- operational problems such as sludge bulking and foaming
- control of solids such as F:M ratio, sludge age
- chemicals used for pH control, odour control, nutrient addition
- flow measurement
- risk factors and potential hazards related to activated sludge systems
- risk control requirements including safety equipment and material safety data sheets
- lockout procedures for mechanical and electrical installations and hydraulic isolation
- equipment operation, capacity and limitations
- operation of pumping and valving systems
- control and communications systems
- policies, procedures and relevant legislation
- relevant utilities and service bodies
- process calculation
- hazardous materials handling
- interpretation and use of material safety data sheets
- chemical and biological principles that form the basis of activated sludge wastewater

## **REQUIRED SKILLS AND KNOWLEDGE**

treatment.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control activated sludge processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Processes*** may include:
- suspended media aerobic processes such as:
  - conventional and/or extended aeration activated sludge
  - contact stabilisation
  - high rate activated sludge processes.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines
  - environment protection
  - occupational health and safety
  - chemicals
  - dangerous goods
  - lifts and cranes
  - Environment Protection Authority regulations
  - licensing agreements
  - electrical standards.
- Equipment*** used may include:
- diffused aeration
  - surface aerators
  - aspirating aerators
  - electronic monitoring and metering systems
  - chart recording systems
  - basic hand tools
  - sampling and laboratory testing equipment
  - computerised equipment
  - on- and off-road vehicles
  - communication equipment
  - personal protective equipment
  - pumps and valves.
- Routine plant inspection*** may include:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - identification of corrosion damage
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws,

## RANGE STATEMENT

- Tests* may include:
- organisational policies and statutory requirements.
  - settling tests
  - microscopic observation
  - pH
  - dissolved oxygen
  - suspended solids
  - oxygen demand
  - oxygen uptake rates
  - respiration rates
  - nutrient analysis, such as:
    - nitrogen
    - phosphorus
    - temperature.
- System adjustments* may include:
- pH correction
  - dissolved oxygen levels
  - flow rates
  - nutrient addition
  - return and wasting rates.
- Process calculations* may include:
- sludge volume index
  - solids inventory
  - food to micro-organisms ratio
  - mean cell residence time
  - oxygen uptake rate and respiration rate
  - return activated sludge flow rate
  - sludge wasting rates
  - secondary sedimentation, such as:
    - detention time
    - weir overflow rate
    - surface and solids loading rate.
- Reports* may include:
- plant performance data
  - chemical usage.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment



# **NWP352B Monitor, operate and control dissolved air flotation processes**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control dissolved air flotation (DAF) plant and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments and produce technical reports are essential to performance.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that dissolved air flotation (DAF) processes in water treatment plants conform to organisational standards and comply with statutory requirements.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor flotation plant performance.</b>	<p>1.1 Monitor test results and <b><i>processes</i></b> to meet <b><i>organisational and statutory requirements</i></b>.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to organisational procedures.</p> <p>1.3 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Operate and control processes.</b>	<p>2.1 Carry out <b><i>routine plant inspections</i></b> according to organisational and plant requirements.</p> <p>2.2 Collect process samples and conduct standard <b><i>tests</i></b>.</p> <p>2.3 Carry out basic <b><i>system adjustments</i></b> and <b><i>process calculations</i></b> to enhance system performance according to organisational procedures.</p> <p>2.4 Collect and report process data according to organisational and plant requirements.</p>
<b>3 Compile process records.</b>	<p>3.1 Compile <b><i>reports</i></b> from plant and system data to meet organisational requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct operational and control system problems
- take samples and perform tests
- produce logs and reports
- perform process calculations
- prepare and apply chemical dosing
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- give and receive instructions
- operate control and communication systems
- use safety and personal protective equipment
- communicate with employees and customers
- perform process calculations.

#### **Required knowledge:**

- process layout
- features and components of dissolved air flotation systems
- theory of process operations
- risk factors and potential hazards related to dissolved air flotation systems
- risk control requirements including safety equipment and material safety data sheets
- lockout procedures for mechanical and electrical installations and hydraulic isolation
- equipment operation, capacity and limitations
- operation of pumping and valving systems
- control and communications systems
- policies, procedures and relevant legislation
- safety equipment and procedures
- relevant utilities and service bodies
- hazardous materials handling
- environment, landscape and ground structure of work area
- procedures for storing and handling dangerous goods and chemicals
- interpretation and use of material safety data sheets.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control dissolved air flotation processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Processes*** may include:
- dissolved air flotation/clarification
  - dissolved air flotation/filtration
  - dissolved air flotation/sludge thickening.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines
  - environment protection
  - occupational health and safety
  - chemicals
  - dangerous goods
  - lifts and cranes
  - World Health Organisation standards
  - Australian Drinking Water Guidelines
  - National Water Quality Management Strategies (NWQMS)
  - Environment Protection Authority regulations
  - licensing agreements
  - electrical standards.
- Routine plant inspections*** may require:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements
  - use of equipment, including:
    - electronic monitoring and metering systems
    - chart recording systems
    - basic hand tools
    - sampling and laboratory testing equipment
    - computerised equipment
    - on- and off-road vehicles
    - communication equipment
    - personal protective equipment.

## **RANGE STATEMENT**

*Tests* may include:

- settling tests
- pH
- flotation tests
- colour
- turbidity
- suspended solids
- total solids.

*System adjustments* may include:

- saturator pressure
- water level and flow rate.

*Process calculations* may include:

- air to solids ratio or air quantity
- recycle ratio
- hydraulic loading rate.

*Reports* may include:

- plant performance data
- chemical usage.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# NWP353B Monitor, operate and control anaerobic bioreactor processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control anaerobic bioreactor processes such as UASB's, fluidised bed reactors, anaerobic digesters, high rate anaerobic lagoons and bulk volume fermenters; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments and produce technical reports is essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that mixed, fixed and suspended media anaerobic bioreactor processes in treatment plants conform to organisational standards and comply with statutory requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.



## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

### Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor anaerobic bioreactor performance.</b>	<p>1.1 Monitor test results and <i>processes</i> to maintain the parameters of operation.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <i>organisational and statutory requirements</i>.</p> <p>1.3 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Operate and control anaerobic bioreactor processes.</b>	<p>2.1 Carry out <i>routine plant inspections</i> according to organisational and plant requirements.</p> <p>2.2 Collect process samples and conduct standard <i>tests</i>.</p> <p>2.3 Carry out basic <i>system adjustments</i> and <i>process calculations</i> to enhance system performance according to organisational requirements.</p> <p>2.4 Collect and report process data according to organisational and plant requirements.</p>
<b>3 Compile process records.</b>	<p>3.1 Compile <i>reports</i> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct operational and control system problems
- take samples and perform tests
- produce logs and reports
- perform process calculations
- determine chemical dosing requirements
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- give and receive instructions
- operate control and communication systems
- use safety and personal protective equipment
- communicate with employees and various customers
- operate computerised equipment.

#### **Required knowledge:**

- process layout
- features and components of anaerobic bioreactor systems
- theory of process operation and monitoring
- anaerobic treatment principles
- chemicals used for pH control, odour control, nutrient addition
- flow measurement
- risk factors and potential hazards related to anaerobic bioreactor systems
- risk control requirements including safety equipment and material safety data sheets
- lockout procedures for mechanical and electrical installations and hydraulic isolation
- equipment operation, capacity and limitations
- operation of pumping and valving systems
- control and communications systems
- policies, procedures and relevant legislation
- hazardous materials handling
- interpretation of material safety data sheets
- chemical and biological principles that form the basis of anaerobic wastewater treatment.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control anaerobic bioreactor processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Processes*** may include:

- solids handling, for example:
- anaerobic digesters
- sludge disposal
- gas production
- industrial wastewater treatment, such as:
- upflow anaerobic sludge blanket reactors
- hybrid reactors
- fluidised bed reactors
- fully mixed reactors
- sealed reactors
- bulk volume fermenters
- high rate anaerobic lagoons.

***Organisational and statutory requirements*** may include:

- by-laws
- organisational policies
- standard operating procedures
- Australian Drinking Water Guidelines
- Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines
- environment protection
- occupational health and safety
- chemicals
- dangerous goods
- lifts and cranes
- National Water Quality Management strategy
- World Health Organisation standards
- Environment Protection Authority regulations
- licensing agreements
- electrical standards.

***Routine plant inspections*** may include:

- use of equipment, including:
- electronic monitoring and metering systems
- manual chart recording systems
- basic hand tools
- sampling and laboratory testing equipment
- computerised equipment

## **RANGE STATEMENT**

- communication equipment
  - personal protective equipment.
  - interaction and communication with other employees, other authorities and the general public
  - visual observation
  - identification of corrosion damage
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.
- Tests* may include:
- settling tests
  - pH
  - redox potential
  - volatile acids
  - gas analysis
  - solids
  - oxygen demand.
- System adjustments* may include:
- pH correction
  - raw sludge feed rates
  - digested sludge (biosolids) wasting rates
  - mixing
  - temperature
  - gas disposal
  - supernatant recirculation.
- Process calculations* may include:
- mass of solids fed to digester
  - volatile solids loading rate
  - hydraulic retention time
  - solids retention time
  - volatile solids reduction
  - volume of seed sludge required.
- Reports* may include:
- plant performance data.

## **Unit Sector(s)**

Not applicable.

## Competency field

Competency field      Treatment

# **NWP354B Monitor, operate and control granular media filtration processes**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control granular media filtration plant; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments, conduct chemical dosing procedures and produce technical reports are essential to performance.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that granular media filtration processes in treatment plants conform to organisational standards and comply with statutory requirements.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.



## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

### Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

### Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor filtration plant performance.</b>	<p>1.1 Monitor test results and <i>processes</i> to meet <i>organisational and statutory requirements</i>.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to organisational procedures.</p>
<b>2 Operate and control filtration processes.</b>	<p>2.1 Carry out <i>routine plant inspections</i> according to organisational and plant requirements.</p> <p>2.2 Collect process samples and conduct standard <i>tests</i>.</p> <p>2.3 Perform process calculations associated with granular media filtration.</p> <p>2.4 Carry out basic <i>system adjustments</i> to enhance system performance according to organisational procedures.</p> <p>2.5 Collect and report process data according to organisational and plant requirements.</p>
<b>3 Compile filtration process reports.</b>	<p>3.1 Compile <i>reports</i> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports and logs
- use safety and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and various customers
- use communication equipment
- give and receive instructions
- perform process calculations
- prepare and apply chemical dosing
- perform system calculations
- operate computerised equipment
- identify control system faults
- sample and test products.

#### **Required knowledge:**

- pressure sand filter hydraulics, gravity sand filter hydraulics, backwash hydraulics
- system layout
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- risk factors and potential hazards related to granular media filtration processes
- equipment operation, capacity and limitations
- pumping and valving systems
- control systems' policies and procedures for storing and handling dangerous goods and chemicals
- interpretation and use of material safety data sheets
- principles that form the basis of granular media filtration processes.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control granular media filtration processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Processes*** may include:
- slow granular media filters
  - conventional granular media filters
  - pressure and gravity granular media filters
  - backwash procedures
  - air assist backwash
  - chemical addition of filter aid polymers.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines
  - environment protection
  - occupational health and safety
  - chemicals
  - dangerous goods
  - lifts and cranes
  - World Health Organisation standards
  - Australian Drinking Water Guidelines
  - National Water Quality Management strategy
  - Environment Protection Authority regulations
  - licensing agreements
  - electrical standards.
- Routine plant inspections*** may include:
- use of equipment, including:
    - electronic monitoring and metering systems
    - chart recording systems
    - basic hand tools
    - sampling and laboratory testing equipment
    - computerised equipment
    - communication equipment
    - personal protective equipment
  - interaction and communication with other employees, other authorities and the general public
  - visual observation
  - identification of corrosion damage
  - implementation of reporting procedures that may also

## RANGE STATEMENT

include procedures for the implementation of by-laws, organisational policies and statutory requirements.

*Tests* may include:

- pH
- turbidity
- colour
- particle counting
- headloss.

*System adjustments* may include:

- pH correction
- filtration rate
- backwash rate
- filtration aid addition.

*Reports* may include:

- chemical usage
- plant performance data.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Treatment

## **NWP355A Monitor, operate and control membrane filtration processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control membrane filtration plant, including micro and ultra filtration; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments, conduct chemical dosing procedures and produce technical reports are essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that membrane filtration processes in treatment plants conform to organisational standards and comply with statutory requirements.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## **Elements and Performance Criteria Pre-Content**

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor membrane filtration plant performance.</b>	<p>1.1 Monitor test results and <i>processes</i> to maintain the parameters of operation.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <i>organisational and statutory requirements</i>.</p> <p>1.3 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>2 Control chemical use.</b>	<p>2.1 Use, handle and store chemicals according to organisational procedures and statutory requirements.</p> <p>2.2 Determine chemical dosing according to plant processes and organisational procedures and statutory requirements.</p> <p>2.3 Maintain chemical supply and usage records according to statutory requirements.</p>
<b>3 Operate and control membrane filtration processes.</b>	<p>3.1 Carry out <i>routine plant inspections</i> according to organisational and plant requirements</p> <p>3.2 Conduct and analyse process <i>tests</i> and determine performance against plant operational requirements.</p> <p>3.3 Make integrated <i>process adjustments</i> to improve system performance according to organisational and statutory requirements.</p> <p>3.4 Collect, interpret and record process data according to organisational and plant requirements.</p>
<b>4 Compile process reports.</b>	<p>4.1 Compile <i>reports</i> from plant and system data to meet organisational and statutory requirements.</p> <p>4.2 Report observations outside defined parameters for further action.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify and correct operational problems
- produce reports and logs
- use safety and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- determine chemical dosing requirements
- perform system calculations
- operate computerised equipment
- identify control system faults
- sample and test products.

#### Required knowledge:

- system layout
- system processes
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- risk factors and potential hazards involved with membrane filtration processes
- interpretation of material safety data sheets
- equipment operation, capacity and limitations
- chemical dosing calculations
- pipes and fittings
- pumping and valving systems
- mechanical and electrical control systems
- principles that form the basis of membrane filtration processes for water or wastewater treatment.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control membrane filtration processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- preparing and applying chemical dosing
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Processes*** may include:
- micro filtration
  - ultra filtration.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - Australian Drinking Water Guidelines
  - National Water Quality Management strategy
  - environment protection
  - occupational health and safety, including the use of personal protective equipment
  - chemicals
  - dangerous goods
  - lifts and cranes
  - Environment Protection Authority regulations
  - World Health Organisation standards
  - licensing agreements
  - electrical standards.
- Routine plant inspections*** may include:
- the use of equipment, including:
    - electronic monitoring and metering systems
    - chart recording systems
    - basic hand tools
    - sampling and laboratory testing equipment
    - computerised equipment
    - on- and off-road vehicles
    - communication equipment
    - personal protective equipment.
  - interaction and communication with other employees, other authorities and the general public
  - visual observation
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.
- Tests*** may include:
- turbidity
  - colour
  - pH

## **RANGE STATEMENT**

*Process adjustments* may include:

- transmembrane pressure.
- pre-treatment
- pH correction
- backwash frequency
- clean in place cycles.

*Reports* may include:

- chemical usage
- environmental reports
- plant performance data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# NWP356B Monitor, operate and control ion exchange processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control ion exchange plant; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments and produce technical reports are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that ion exchange processes in treatment plants conform to organisational standards and comply with statutory requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor ion exchange plant performance.</b>	<p>1.1 Monitor test results and <b><i>processes</i></b> to maintain the parameters of operation.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <b><i>organisational and statutory requirements</i></b>.</p>
<b>2 Operate and control ion exchange processes.</b>	<p>2.1 Carry out <b><i>routine plant inspections</i></b> according to organisational and plant requirements.</p> <p>2.2 Conduct and analyse process <b><i>tests</i></b> and determine performance against plant operational requirements.</p> <p>2.3 Make integrated <b><i>process adjustments</i></b> to optimise system performance according to organisational and statutory requirements.</p> <p>2.4 Collect interpret and record process data according to organisational and plant requirements.</p> <p>2.5 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>3 Compile process reports.</b>	<p>3.1 Compile <b><i>reports</i></b> from plant and system data to meet organisational and statutory requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports and logs
- use safety and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- operate computerised equipment
- identify control system faults
- perform system calculations
- collect samples and perform tests.

#### **Required knowledge:**

- system layout
- system processes
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- interpretation of material safety data sheets
- chemical principles of water treatment processes
- risk factors and potential hazards
- equipment operation, capacity and limitations
- pipes and fittings
- pumping and valving systems
- mechanical and electrical control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control ion exchange processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Processes*** may include:
- pre-treatment, including:
    - screening
    - pH correction
    - ion exchange, including:
      - softening
      - demineralisation
      - natural organic matter and dissolved organic carbon removal.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - occupational health and safety
  - use of chemicals
  - dangerous goods
  - electrical
  - lifts and cranes
  - World Health Organisation standards
  - Australian Drinking Water Guidelines
  - National Water Quality Management strategy
  - licensing agreements.
- Routine plant inspection*** may include:
- use of equipment, including:
    - electronic monitoring and metering systems
    - chart recording systems
    - basic hand tools
    - sampling and laboratory testing equipment
    - computerised equipment
    - personal protective equipment
    - interaction and communication with other employees, other authorities and the general public
    - visual observation
    - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.

## **RANGE STATEMENT**

*Tests* may include:

- electrical conductivity
- ion exchange capacity
- pH
- hardness
- alkalinity.

*Process adjustments* may include:

- pre-treatment optimisation
- bypass flows
- service and regeneration cycles
- regeneration chemicals
- waste disposal.

*Reports* may include:

- chemical usage
- environmental reports
- plant performance data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# **NWP357B Monitor, operate and control reverse osmosis and nano-filtration processes**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control reverse osmosis (RO) and/or nano-filtration (NF) plant; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments and produce technical reports are essential to performance.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that reverse osmosis and/or nano-filtration processes in treatment plants conform to organisational standards and comply with statutory requirements.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor RO and/or NF processes.</b>	<p>1.1 Monitor test results and <b><i>processes</i></b> to maintain the parameters of operation.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <b><i>organisational and statutory requirements</i></b>.</p>
<b>2 Operate and control RO and/or NF processes.</b>	<p>2.1 Carry out <b><i>routine plant inspections</i></b> according to organisational and plant requirements.</p> <p>2.2 Conduct and analyse process <b><i>tests</i></b> and compare performance to plant operational requirements.</p> <p>2.3 Make integrated <b><i>process adjustments</i></b> to optimise system performance according to organisational and statutory requirements.</p> <p>2.4 Collect, interpret and record process according to organisational and plant requirements.</p> <p>2.5 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>3 Compile process reports.</b>	<p>3.1 Compile <b><i>reports</i></b> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- solve operational problems
- produce reports and logs
- use safety and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- determine chemical dosing requirements
- perform system calculations
- operate control equipment
- identify control system faults
- perform system calculations
- collect samples and perform tests.

#### Required knowledge:

- system layout
- system processes
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- interpretation of material safety data sheets
- principles that form the basis of reverse osmosis and nano-filtration processes
- risk factors and potential hazards
- equipment operation, capacity and limitations
- pipes and fittings
- pumping and valving systems
- mechanical and electrical control systems.



## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control reverse osmosis and nano-filtration processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## **EVIDENCE GUIDE**

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Processes*** may include:

- pre-treatment, for example
- screening
- scaling chemicals
- reverse osmosis, for example:
- desalination
- demineralisation
- nano-filtration, for example:
- desalination
- demineralisation.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- occupational health and safety, including use of personal protective equipment
- chemicals
- dangerous goods
- electrical
- lifts and cranes
- World Health Organisation standards
- Australian Drinking Water Guidelines
- National Water Quality Management strategy
- licensing agreements.

***Routine plant inspection*** may include:

- use of equipment, including:
- electronic monitoring and metering systems
- chart recording systems
- basic hand tools
- sampling and laboratory testing equipment
- computerised equipment
- personal protective equipment
- interaction and communication with other employees, other authorities and the general public
- visual observation
- implementation of reporting procedures that may also include procedures for the implementation of by-laws,

## RANGE STATEMENT

- Tests* may include:
- organisational policies and statutory requirements.
  - electrical conductivity
  - total dissolved solids
  - pH
  - temperature
  - turbidity
  - pressure
  - silt density index
  - scaling potential.
- Process adjustments* may include:
- pH control
  - chemical cleaning
  - pre-treatment optimisation
  - flow control
  - waste disposal.
- Reports* may include:
- organisational reports
  - environmental reports
  - plant performance data.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field** Treatment

# **NWP359B Monitor, operate and control nutrient removal processes**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control nutrient removal plant; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments, conduct chemical dosing procedures and produce technical reports are essential to performance.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that nutrient removal processes in treatment plants conform to organisational standards and comply with statutory requirements.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor nutrient removal process performance.</b>	<p>1.1 Monitor test results and <b><i>processes</i></b> to maintain the parameters of operation.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <b><i>organisational and statutory requirements</i></b>.</p>
<b>2 Operate and control nutrient removal processes.</b>	<p>2.1 Carry out <b><i>routine plant inspections</i></b> according to organisational and plant requirements.</p> <p>2.2 Conduct and analyse process <b><i>tests</i></b> and compare performance to plant operational requirements.</p> <p>2.3 Make integrated <b><i>system adjustments</i></b> and <b><i>process calculations</i></b> to optimise system performance according to organisational and statutory requirements.</p> <p>2.4 Collect, interpret and record process data according to organisational and plant requirements.</p> <p>2.5 Use <b><i>chemicals</i></b> as required and record handling, storage, dosage and use according to organisational requirements.</p>
<b>3 Compile nutrient removal process reports.</b>	<p>3.1 Compile <b><i>reports</i></b> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct operational and control system problems
- take samples and perform tests
- produce logs and reports
- perform process calculations
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- give and receive instructions
- determine chemical dosing requirements
- operate control and communication systems
- use safety and personal protective equipment
- communicate with employees and customers.

#### **Required knowledge:**

- process layout
- features and components of nutrient removal systems
- theory of process operation and monitoring
- biological and/or chemical treatment principles that form the basis of nutrient removal processes
- chemicals used for pH control, odour control, nutrient removal
- chemical dosing processes
- risk factors and potential hazards related to nutrient removal systems
- risk control requirements including safety equipment and material safety data sheets
- lockout procedures for mechanical and electrical installations and hydraulic isolation
- equipment operation, capacity and limitations
- operation of pumping and valving systems
- control and communications systems
- policies, procedures and relevant legislation
- relevant utilities and service bodies
- hazardous materials handling
- interpretation and use of material safety data sheets
- environmental aspects of wastewater treatment.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control nutrient removal processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- preparing and applying chemical dosing
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence



## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Processes*** may include:

- chemical and adsorption techniques
- chemical nitrogen removal
- biological nitrogen removal
- enhanced ammonia removal
- chemical phosphorus removal
- biological phosphorus removal.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- National Water Quality Management strategy
- environment protection
- occupational health and safety, including use of personal protective equipment
- chemicals
- dangerous goods
- lifts and cranes
- Environment Protection Authority regulations
- World Health Organisation standards
- licensing agreements
- electrical standards.

***Routine inspection of plant*** may include:

- use of equipment, including:
- electronic monitoring and metering systems
- chart recording systems
- basic hand tools
- sampling and laboratory testing equipment computerised equipment
- personal protective equipment
- interaction and communication with other employees, other authorities and the general public
- visual observation
- implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.

***Tests*** may include:

- solids analysis
- nitrogen and phosphorus analysis

## RANGE STATEMENT

- System adjustments* may include:
- microscopy and routine jar testing
  - oxygen demand
  - pH.
  - recirculation rates
  - wasting rates
  - organic and hydraulic loadings
  - surface loading rates
  - pH adjustment
  - chemical dosing.
  - chemical feed rates.

*Process calculations* may include:

*Chemicals* may include:

- aluminium and iron based coagulants
- synthetic organic polymers
- carbon sources.

*Reports* may include:

- environmental reports
- chemical usage
- plant performance data.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Treatment

# NWP360B Monitor, operate and control dewatering processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control water and wastewater dewatering and sludge thickening plant and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments, conduct chemical dosing procedures and produce technical reports are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that water and/or wastewater dewatering and sludge thickening processes conform to organisational standards and comply with statutory requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor dewatering process performance.</b>	<p>1.1 Monitor test results and <b><i>processes</i></b> to maintain the parameters of operation.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <b><i>organisational and statutory requirements</i></b>.</p>
<b>2 Control chemical use.</b>	<p>2.1 Use, handle and store <b><i>chemicals</i></b> according to organisational and statutory requirements.</p> <p>2.2 Determine and carry out chemical dosing according to plant processes and organisational and statutory requirements.</p> <p>2.3 Maintain chemical supply and usage records according to statutory requirements.</p> <p>2.4 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
<b>3 Operate and control dewatering processes.</b>	<p>3.1 Carry out <b><i>routine plant inspections</i></b> according to organisational and plant requirements.</p> <p>3.2 Conduct and analyse process <b><i>tests</i></b> and determine performance against plant operational requirements.</p> <p>3.3 Make integrated <b><i>process adjustments</i></b> to optimise system performance according to organisational and statutory requirements.</p> <p>3.4 Collect, interpret and record process data according to organisational and plant requirements.</p>
<b>4 Compile dewatering process reports.</b>	<p>4.1 Compile <b><i>reports</i></b> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>4.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct operational and control system problems
- take samples and perform tests
- prepare and apply chemical dosing
- produce logs and reports
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- give and receive instructions
- operate control and communication systems
- use safety and personal protective equipment
- communicate with employees and customers
- give and receive instructions
- perform system calculations.

#### **Required knowledge:**

- process layout
- features and components of thickening and dewatering systems
- theory of process operation
- chemicals used for sludge conditioning
- chemical dosing processes
- risk factors and potential hazards related to thickening and dewatering systems
- risk control requirements including safety equipment and material safety data sheets
- lockout procedures for mechanical and electrical installations and hydraulic isolation
- equipment operation, capacity and limitations
- operation of pumping and valving systems
- control and communications systems
- policies, procedures and relevant legislation
- relevant utilities and service bodies
- hazardous materials handling
- environmental aspects of water and/or wastewater treatment
- procedures for storing and handling dangerous goods and chemicals
- interpretation and use of material safety data sheets
- chemical principles that form the basis of dewatering processes.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control dewatering processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- preparing and applying chemical dosing
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

- Processes*** may include:
- tables
  - drying beds
  - rotating drum filters
  - belt press
  - centrifuge
  - rotary press
  - plate frame press
  - DAF thickeners.
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - Australian Drinking Water Guidelines
  - National Water Quality Management strategy
  - occupational health and safety, including use of personal protective equipment
  - chemicals
  - dangerous goods
  - lifts and cranes
  - Environment Protection Authority regulations
  - World Health Organisation standards
  - licensing agreements
  - electrical standards.
- Chemicals*** may include:
- synthetic and organic polymers.
- Routine inspection of plant*** may include:
- use of equipment, including:
  - electronic monitoring and metering systems
  - chart recording systems
  - basic hand tools
  - sampling and laboratory testing equipment
  - computerised equipment
  - communication equipment
  - personal protective equipment
  - interaction and communication with other employees, other authorities and the general public

## **RANGE STATEMENT**

- Tests* may include:
- visual observation
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.
- System adjustments* may include:
- solids analysis
  - jar testing
  - sludge density
  - centrate clarity
  - dewatering process efficiency.
- Reports* may include:
- loading rates
  - chemical dosing rates
  - dewatering polymers
  - centrifuge settings.
  - environmental reports
  - chemical usage
  - plant performance data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# **NWP361B Monitor, operate and control gas scrubber treatment processes**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control gas scrubber plant; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments and produce technical reports are essential to performance.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that gas scrubber processes in treatment plants conform to organisational standards and comply with statutory requirements.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Monitor gas scrubber plant performance.	<p>1.1 Monitor test results and <b><i>processes</i></b> to maintain the parameters of operation.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <b><i>organisational and statutory requirements</i></b>.</p>
2 Operate and control gas scrubber processes.	<p>2.1 Carry out <b><i>routine plant inspections</i></b> according to organisational and plant requirements.</p> <p>2.2 Conduct and analyse process <b><i>tests</i></b> and compare performance to operational requirements.</p> <p>2.3 Make <b><i>integrated process adjustments</i></b> to optimise system performance according to organisational procedures and statutory requirements.</p> <p>2.4 Collect, interpret and record process data according to organisational and plant requirements.</p> <p>2.5 Correctly select, fit and use required safety equipment, including personal protective equipment.</p>
3 Compile gas scrubber process reports.	<p>3.1 Compile <b><i>reports</i></b> from plant and system data to meet organisational procedures and statutory requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports and logs
- use safety and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- operate control equipment
- identify control system faults
- perform system calculations
- collect samples and conduct tests.

#### **Required knowledge:**

- system layout
- system processes
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- interpretation and use of material safety data sheets
- environmental aspects of gas scrubber processes
- biological principles of gas scrubber processes
- system calculations
- risk factors and potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- pipes and fittings
- pumping and valving systems
- mechanical and electrical control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control gas scrubber treatment processes, including:

- monitoring test results and processes
- identifying and reporting faults
- conducting routine plant inspections
- taking samples and performing basic tests
- making basic process adjustments according to instructions
- collecting data and completing required documentation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Processes*** may include:

- granular activated carbon
- liquid cocurrent
- liquid counter current
- soil contactors.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- Australian Drinking Water Guidelines
- National Water Quality Management strategy
- occupational health and safety, including use of personal protective equipment
- chemicals
- dangerous goods
- electrical
- lifts and cranes
- World Health Organisation standards
- licensing agreements.

***Routine inspection of plant*** may include:

- use of equipment, including:
  - electronic monitoring and metering systems
  - chart recording systems
  - basic hand tools
  - sampling and laboratory testing equipment
  - computerised equipment
  - personal protective equipment
- interaction and communication with other employees, other authorities and the general public
- visual observation
- implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.

***Tests*** may include:

- gas analysis
- odour testing.

***Integrated process***

- hydraulic loadings
- recirculation rates



## **RANGE STATEMENT**

- adjustments* may include:
- air flow rates.
- Reports* may include:
- environmental reports
  - organisational reports
  - plant performance data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment

# **NWP362B Monitor, operate and control reclaimed water irrigation**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control reclaimed water irrigation and the use of reclaimed water for irrigation practices.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for analysing the critical aspects of reclaimed water reuse management relating to a project or site and implementing reclaimed water reuse irrigation in compliance with organisational, environmental and legislative requirements.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Assess sites for reclaimed water irrigation.</b>	<p>1.1 Identify soil/water interactions and <b><i>soil properties</i></b> important for plant growth.</p> <p>1.2 Identify soil <b><i>sampling</i></b> sites, collect samples and conduct <b><i>soil testing</i></b>.</p> <p>1.3 Classify soils using field texture, pH and structure analysis.</p> <p>1.4 Monitor and determine the <b><i>water holding capacity</i></b> of the soil.</p>
<b>2 Assess quality of reclaimed water for irrigation.</b>	<p>2.1 Sample and test reclaimed water and interpret <b><i>quality parameters</i></b>.</p> <p>2.2 Determine crops suitable for the quality of reclaimed water and site conditions.</p>
<b>3 Implement reclaimed water irrigation.</b>	<p>3.1 Identify basic features of <b><i>irrigation systems</i></b>.</p> <p>3.2 Operate and maintain irrigation <b><i>equipment</i></b> according to organisational requirements.</p> <p>3.3 Identify and apply irrigation <b><i>scheduling options</i></b> for reclaimed water.</p> <p>3.4 Use crop factors and climate data to produce <b><i>water budgets</i></b>.</p> <p>3.5 Apply irrigation water and collect and monitor tail water or runoff according to <b><i>organisational and statutory requirements</i></b>.</p>
<b>4 Respond to water or soil quality issues.</b>	<p>4.1 Develop <b><i>irrigation management options</i></b> to respond to water quality issues.</p> <p>4.2 Identify and apply requirements and options for <b><i>soil ameliorants</i></b>.</p> <p>4.3 Monitor infiltration and drainage according to organisational requirements.</p>
<b>5 Compile reclaimed water irrigation records.</b>	<p>5.1 Compile <b><i>reports</i></b> to meet organisational procedures and statutory requirements.</p> <p>5.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- implement best practice irrigation procedures
- monitor and manage soil
- solve operational problems
- access, interpret and apply relevant legislation
- apply environmental policies, plans and procedures
- apply control procedures to environmental risks and incidents
- assess environmental risks at the work site
- report and record environmental procedures
- access, interpret and apply standard operating procedures
- communicate effectively with customers
- complete basic workplace records and/or reports
- identify soil groups
- use safety and personal protective equipment
- perform work-related calculations
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- sample and test soil and water.

#### **Required knowledge:**

- key principles of irrigation practices, including irrigation scheduling
- key characteristics of reclaimed water
- relevant legislative requirements
- standard operating procedures
- environmental management procedures
- control procedures for environmental risks and incidents
- risk assessment procedures
- environmental impact assessment
- recording procedures
- reporting procedures
- established environmental management procedures
- risk assessment procedures
- primary agencies involved in drinking water quality management
- water quality performance indicators
- an overview of the water supply system
- water hazardous agents and preventative strategies

## **REQUIRED SKILLS AND KNOWLEDGE**

- community and agency roles and responsibilities in monitoring water quality
- best management practices for the use of reclaimed water for irrigation purposes
- reclaimed water usage licensing procedures and requirements
- environmental, landscape and ground structure of work area
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- interpretation and use of material safety data sheets.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control reclaimed water irrigation, including:

- analysis of the critical aspects of reclaimed water reuse management relating to the project or site
- implementing reclaimed water reuse irrigation
- identifying environment, health and safety risks and impact on soil, stock and operators
- applying environmental procedures
- participating in and contributing to reviews of reclaimed water reuse procedures.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- collecting and noting circumstances and observations relating to a specific breaches of legislation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Soil properties*** may include:

- surface soil
- subsoil
- soil profiles
- a, b & c horizons
- texture:
- rock/gravel
- sand
- silt
- clay
- soil structure
- aggregates
- minerals
- pores
- soil colour.

***Soil sampling*** may include:

- selection of sample site/s using methods such as:
- grid
- random
- zigzag
- transect
- collection of samples from:
- field pits
- auger holes
- consistent application of sampling procedures as identified by the Department of Agriculture
- maintenance of the integrity of the sample according to applicable statutory guidelines (Department of Agriculture, EPA).

***Soil testing*** may include:

- soil pH
- soil texture assessment
- mottle colour
- soil nutrients
- nitrogen
- phosphorus (Olsen P or Colwell P)
- potassium



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- fertiliser requirements
  - cation exchange capacity (CEC)
  - exchangeable sodium percentage (ESP)
  - calcium/magnesium ratio
  - organic matter
  - hydraulic conductivity
  - consistence (dry only)
  - strength
  - stickiness
  - plasticity
  - Emerson dispersion grade.
- Water holding capacity* may include:
- hydraulic conductivity
  - soil water potential
  - infiltration/leaching rates
  - field capacity determination.
- Reclaimed water *quality parameters* may include:
- pH
  - BOD/COD
  - total salt concentration
  - total Dissolved Solids (TDS)
  - soluble salts by electrical conductivity (EC)
  - nutrients - N, P, K
  - anions and cations
  - sodium adsorption ratio (SAR)
  - adjusted SAR.
- Irrigation systems* may include:
- border check flood irrigation
  - graded or contour furrows
  - sub-surface irrigation
  - sprinklers
  - localised systems, such as:
  - drip
  - micro spray
  - trickle.
- Equipment* may include:
- electronic monitoring and metering systems
  - reclaimed water flow distribution systems, including:
  - pipes
  - valves
  - pumps
  - channels
  - checks
  - drains

## RANGE STATEMENT

- collection dams
  - flow control gates
  - pressured distribution equipment, such as:
  - sprinklers
  - travelling irrigators
  - sampling and testing equipment
  - infiltration testing equipment
  - manual chart recording systems
  - on- and off-road vehicles
  - communication equipment
  - atmosphere monitoring equipment
  - personal protective equipment
  - communication equipment
  - computerised equipment.
- Irrigation scheduling options* may include:
- measurement of soil moisture content
  - on-site, physical soil moisture investigations
  - evaporation minus rainfall calculations
  - tensiometers
  - gypsum blocks
  - neutron probes
  - capacitance probes.
- Water budgets* may include:
- weather details
  - rainfall
  - evaporation
  - crop factors and predicted plant water requirement
  - leaching requirements
  - soil types and characteristics
  - monthly/yearly calculation of reclaimed water required
  - calculation of suitable land areas for use.
- Organisational requirements* may include:
- organisational policies and procedures
  - occupational health and safety
  - electrical and mechanical procedures.
- Statutory requirements* may include:
- environmental legislation, including relevant:
  - Federal legislation
  - State/Territory legislations
  - local government by-laws
  - government or quasi-government policies and regulations
  - community planning and development agreements, such as land care agreements
  - Water Acts

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- licensing and/or drainage agreements
  - plumbing and drainage standards
  - hazardous substances
  - World Health Organisation standards
  - NHMRC guidelines.
- Irrigation management options* may include:
- shandyng to reduce salt or nutrient loads
  - managing algal outbreaks
  - identification and reduction of odours from irrigation
  - restricting livestock or public access due to water quality issues
  - suspension of irrigation.
- Soil ameliorants* may include:
- gypsum (calcium sulphate)
  - hydrated lime (limi)
  - agricultural lime (calcium carbonate)
  - biosolids.
- Reports* may include:
- reclaimed water irrigation data including:
  - applications dates and volumes applied
  - volumes of run-off
  - water quality
  - rainfall, evaporation and/or other meteorological data
  - water budgets
  - salt budgets
  - plant performance data.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# NWP363B Monitor performance and control maintenance of treatment plant assets

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor the performance of pipes, pumps, valves and controlling equipment in treatment plants and to plan and conduct maintenance and repair of water and wastewater treatment plant assets to optimise plant performance. The ability to gather and analyse technical data, conduct risk assessments, evaluate maintenance requirements and prepare maintenance plans, perform technical maintenance activities and prepare technical reports are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that treatment plants are maintained in good condition and that equipment performs to the optimum standards.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

### **Elements and Performance Criteria Pre-Content**

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Inspect, record and analyse asset condition.</b>	1.1 Schedule <i>routine inspections</i> of assets and monitor fault reporting according to <i>organisational and statutory requirements</i> .
	1.2 Collect and analyse data on assets and infrastructure condition according to organisational procedures.
	1.3 Determine and cost asset maintenance and repair methods.
<b>2 Plan and prepare for asset repair.</b>	2.1 Schedule and plan work site investigations and repair activities according to organisational requirements.
	2.2 Develop repair plans and procedures and communicate to all stakeholders.
	2.3 Assess and record environmental and occupational health and safety and determine and apply preventative measures according to organisational requirements.
	2.4 Correctly select, fit and use required safety equipment, including personal protective equipment.
<b>3 Control and monitor work activities.</b>	3.1 Inspect materials and <i>equipment</i> and monitor materials handling and repairs to ensure compliance with organisational requirements.
	3.2 Locate and remove system chokes and blockages to achieve maximum system performance.
	3.3 Repair or replace leakages and/or damaged pipes and fittings according to organisational requirements.
	3.4 Clean the plant and surrounds to meet organisational and environmental requirements.
<b>4 Complete maintenance and repair records.</b>	4.1 Monitor repair and maintenance progress.
	4.2 Record and process repair and maintenance activities according to organisational procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- conduct fault finding
- undertake maintenance
- produce reports and logs
- use safety and personal protective equipment
- use tools and machinery
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- apply construction techniques
- identify control system faults
- adjust mechanical and electrical systems.

#### **Required knowledge:**

- finding techniques
- system layout
- lock out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- preventative maintenance
- breakdown maintenance
- mechanical seals
- corrosion protection
- lubrication
- communication systems
- materials handling
- environment, landscape and ground structure of work area
- risk factors and potential hazards
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site or plant
- construction techniques and jointing systems
- control systems
- pipes and fittings.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to optimise plant performance by:

- scheduling inspection and monitoring fault reports
- collecting and analysing data
- selecting and costing maintenance and repair methods
- planning repair activities
- developing and applying repair procedures
- assessing and managing risks
- inspecting materials
- monitoring and recording repairs.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence



## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Routine inspections*** may include:

- inspection of pipes, including:
  - polyvinyl chloride (PVC)
  - galvanised wrought iron
  - polyethylene
  - cast iron
  - mild steel cement lined
  - ductile iron
  - clay
  - asbestos cement
  - concrete
  - steel.
- inspection of fittings, including:
  - jointing systems for pipe types, eg gibault
  - tension bands
  - solvent joints
  - mechanical seals
  - compression ring joints
  - valves.
- inspection of mechanical equipment, including:
  - pumps
  - blowers
  - compressors
  - gearboxes
  - rakes
  - motors
  - pressure vessels
  - mixers
  - chemical feeders
  - actuators.
- by-laws or organisational policies
- standard operating procedures
- environment protection
- Australian Drinking Water Guidelines
- National Water Quality Management strategy

***Organisational and statutory requirements*** may include:

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- Equipment* may include:
- occupational health and safety, including use of personal protective equipment
  - lifts and cranes
  - mines
  - electrical standards
  - dangerous goods
  - chemicals
  - World Health Organisation standards
  - Environment Protection Authority regulations.
  - hand and power tools
  - lifting and winching equipment
  - electric and gaseous welding equipment
  - closed circuit television
  - electronic and manual controlling equipment
  - pneumatic and motorised equipment:
    - compressors
    - pneumatic tools
    - motorised saws
    - grinders
    - pumps
  - communication equipment
  - personal protective equipment.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Asset management

## NWP364B Perform laboratory testing

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to perform laboratory tests and/or procedures using standard methods and with access to readily available advice.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for laboratory or field assistants with responsibility for testing samples from water and/or wastewater treatment processes.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Label, register and store samples for testing.</b>	<p>1.1 Label laboratory samples, ensuring that the required information is transcribed accurately and legibly.</p> <p>1.2 Register samples in a <i>laboratory record system</i> according to organisational requirements.</p> <p>1.3 Record sample testing requirements.</p> <p>1.4 <i>Preserve</i> the integrity of samples as required and eliminate the possibility of cross-contamination.</p>
<b>2 Prepare samples.</b>	<p>2.1 Identify samples to be tested and appropriate test method, equipment and safety requirements according to <i>organisational and statutory requirements</i>.</p> <p>2.2 Compare sample description with the specification, record results and report discrepancies.</p> <p>2.3 <i>Prepare samples</i> according to appropriate standard operating procedures.</p>
<b>3 Check equipment before use.</b>	<p>3.1 Set up test equipment and/or reagents in accordance with the specified test method.</p> <p>3.2 Conduct <i>pre-use and safety checks</i> in accordance with organisational procedures and manufacturer's instructions.</p> <p>3.3 Identify and report faulty or unsafe equipment to appropriate personnel.</p> <p>3.4 Check the calibration status of equipment and conduct calibration or report calibration requirements to appropriate personnel.</p>
<b>4 Perform tests on samples.</b>	<p>4.1 Perform the sequence of tests according to standard operating procedures.</p> <p>4.2 Identify, prepare and weigh or measure sample and standards to be tested.</p> <p>4.3 Conduct <i>test methods</i> according to organisation procedures.</p> <p>4.4 Record results according to organisation procedures.</p> <p>4.5 Perform <i>calculations</i> as required.</p> <p>4.6 Identify and report 'Out of specification' or atypical results promptly to appropriate personnel.</p> <p>4.7 Shut down equipment in accordance with standard operating procedures.</p>
<b>5 Maintain a safe work environment.</b>	<p>5.1 Use established safe work practices and <i>safety equipment</i> to ensure personal safety and that of other laboratory personnel.</p> <p>5.2 Store unused reagents as required by relevant regulations and codes.</p> <p>5.3 Dispose of wastes according to organisational and statutory requirements.</p>

**ELEMENT**

**PERFORMANCE CRITERIA**

5.4 Clean, maintain and store test equipment correctly.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

**Required skills:**

- produce laboratory reports and logs
- use laboratory safety equipment and personal protective equipment
- interpret laboratory test methods
- interpret policies, procedures and standards
- interpret and record test results, including calculation of results from test data where required
- communicate with employees and/or customers
- use communication equipment
- give and receive instructions
- use instrumental and volumetric laboratory equipment
- sub-sample and test products.

**Required knowledge:**

- purpose of tests
- principles of the standard method
- calibration and/or pre-use equipment checks and their basis
- relevant standards and specifications and their interpretation
- source of uncertainty in measurements and methods for control
- importance and appropriate use of certified reference materials
- procedures for recognition of unexpected or unusual results and likely causes
- occupational health and safety procedures for sample and testing
- material safety data sheets
- jar testing
- spectrophotometric analysis
- potentiometric analysis such as redox, ion selective electrodes
- colorimetric comparators
- titrations
- volumetric glassware and dilutions
- gravimetric analysis.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidates should demonstrate the ability to perform laboratory tests and procedures including:

- labelling samples for testing
- registering samples and storing correctly
- preparing samples for testing according to the specified test method
- selecting the correct equipment and checking equipment performance
- conducting tests according to specifications
- maintaining a safe work environment.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence



## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Laboratory record systems*** may include:
- laboratory record sheets
  - computer database
  - laboratory information management systems.
- Preservation techniques*** may include:
- refrigeration
  - freezing
  - chemical addition
  - storage in the dark.
- Organisational and statutory requirements*** may include:
- Australian and International Standards such as AS 2830 Good Laboratory Practice
  - codes of practice
  - standard operating procedures
  - equipment manuals
  - equipment start up, operation and shutdown procedures
  - calibration and maintenance schedules
  - quality manuals
  - enterprise recording and reporting procedures
  - production and laboratory schedules
  - material safety data sheets
  - material, production and product specifications
  - sections of the occupational health and safety legislation
  - organisational safety rules and procedures
  - relevant state and federal legislation.
- Samples preparation*** may include:
- sub-sampling
  - dilution
  - digestion
  - filtration.
- Pre-use and safety checks*** may include:
- checklist of required equipment and reagents
  - instrument check out procedures
  - electrical safety test and tag currency
  - calibration status
  - battery condition
  - use-by date for reagents.
- Test methods*** include:
- gravimetric analysis, such as:

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- suspended solids
- total solids
- spectrophotometric analysis, such as:
  - iron
  - aluminium
  - manganese
- volumetric analysis and dilutions, such as:
  - alkalinity
  - hardness
- test methods may also include:
  - potentiometric analysis, such as:
    - ion selective electrodes
    - redox potential
  - colorimetric analysis, such as:
    - pH
    - chlorine residual
  - microscope techniques
  - jar testing.

*Calculations* may include:

- total suspended solids
- total solids
- alkalinity
- hardness
- dilution ratios
- concentration of standard solutions.

*Safety equipment* may include:

- fume hood
- safety shield
- safety shower and eye wash fountain
- personal protective equipment such as:
  - safety glasses
  - face shields
  - gloves
  - dust masks.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field    Common

## **NWP365A Identify and confirm blue green algae outbreaks**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to identify and confirm outbreaks of blue green algae blooms.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that water and/or wastewater quality conforms to organisational standards and complies with statutory requirements.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare samples.</b>	<p>1.1 Receive, handle and prepare samples testing according to <b><i>organisational and statutory requirements</i></b>.</p> <p>1.2 Prepare and check <b><i>testing equipment</i></b> for blue-green algae identification and enumeration according to organisational requirements.</p>
<b>2 Conduct tests for blue green algae.</b>	<p>2.1 Conduct blue green algae <b><i>tests</i></b> according to organisational requirements.</p> <p>2.2 Identify and confirm blue green algae.</p> <p>2.3 Report blue green algae test results according to organisational requirements.</p>
<b>3 Compile blue green algae reports.</b>	<p>3.1 Compile <b><i>reports</i></b> to meet organisational requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify blue green algae types
- produce reports and logs
- use safety and personal protective equipment
- interpret instructions
- interpret policies, procedures and standards
- communicate with employees and/or customers
- give and receive instructions
- work effectively as part of a team
- determine process requirements
- operate control equipment
- perform system calculations
- conduct blue green algae identification and enumeration tests.

#### **Required knowledge:**

- characteristics of blue green algae
- problems caused by blue green algae blooms
- methods of blue green algae control
- relevant utilities and service bodies
- communication systems
- impact of blue green algae on water and/or wastewater treatment processes
- risk factors and potential hazards associated with handling blue green algae samples
- equipment operation, capacity and limitations.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to conduct blue green algae testing, including:

- identification of blue green algae types and characteristics
- reporting blue algae incidents according to organisational and statutory requirements.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the



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elements in this unit.

Questioning will be appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Testing equipment may include:***
- microscope
  - Sedgwick-Rafter counting chamber
  - volumetric glassware
  - equipment and solutions for sample concentration
  - identification charts and photos.
- Tests include:***
- blue green algae identification and enumeration
  - tests may also include:
  - Secchi clarity
  - odour testing.
- Organisational and statutory requirements may include:***
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - occupational health and safety, including use of personal protective equipment
  - Australian Drinking Water Guidelines
  - National Water Quality Management strategy
  - World Health Organisation standards
  - licensing agreements
  - Environment Protection Authority regulations.
- Reports may include:***
- organisational reports:
  - alert levels
  - government agencies
  - water users/special consumers
  - environmental reports
  - chemical usage
  - plant performance data.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field    Common

# NWP366A Monitor, operate and control chloramination disinfection processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor, operate and control chloramination processes; and to measure and report on system performance and process quality control. The ability to identify faults, determine and apply technical adjustments and produce technical reports are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that chloramination processes conform to organisational standards and comply with statutory requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor chloramination process performance.</b>	<p>1.1 Conduct and analyse process <b><i>tests</i></b> and compare performance to plant operational requirements.</p> <p>1.2 Identify and report process faults and the operational condition of plant according to <b><i>organisational and statutory requirements</i></b>.</p>
<b>2 Operate and control chloramination processes.</b>	<p>2.1 Carry out <b><i>routine plant inspections</i></b> out according to organisational and plant requirements.</p> <p>2.2 Make <b><i>process adjustments</i></b> to optimise system performance according to organisational requirements.</p> <p>2.3 Collect, interpret and record process data according to organisational and plant requirements.</p>
<b>3 Prepare and apply chloramination chemical dosing.</b>	<p>3.1 Use, handle and store <b><i>chemicals</i></b> according to organisational requirements.</p> <p>3.2 Prepare chemical dosing according to system specifications and organisational requirements.</p> <p>3.3 Maintain information related to chlorine and ammonia supply and usage according to organisational requirements.</p>
<b>4 Compile chloramination process reports.</b>	<p>4.1 Compile <b><i>reports</i></b> from plant and system data to meet organisational requirements.</p> <p>4.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct operational problems
- produce reports and logs
- use safety and personal protective equipment
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and/or customers
- use communication equipment
- give and receive instructions
- determine process requirements
- operate control and chemical dosing equipment
- perform chloramination process calculations
- collect samples and conduct tests.

#### **Required knowledge:**

- microbiological aspects of water quality
- chloramination process theory
- chlorine and ammonia dosing equipment
- operational problems such as nitrification
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- communication systems
- hazardous materials handling
- material safety data sheets
- risk factors and potential hazards associated with chloramination processes
- equipment operation, capacity and limitations
- mechanical and electrical control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control chloramination systems, including:

- analysing tests
- identifying and reporting process and operational faults
- monitoring chloramination systems
- making appropriate system adjustments
- collecting and reporting process data
- preparing and applying chloramination chemical dosing.
- producing reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Tests*** may include:

- chlorine residual analysis, including:
- total residual chlorine
- monochloramine
- dichloramine
- ammonia and hypochlorite strength
- pH.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- occupational health and safety, including use of personal protective equipment
- Australian Drinking Water Guidelines
- National Water Quality Management Strategy
- hazardous substances
- lifts and cranes
- World Health Organisation standards
- licensing agreements
- Environment Protection Authority regulations.

***Routine inspection of plant*** may include:

- use of equipment, including:
- electronic monitoring and metering systems
- chart recording systems
- basic hand tools
- sampling and laboratory testing equipment
- computerised equipment
- personal protective equipment
- interaction and communication with other employees, other authorities and the general public
- visual observation
- implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.

***Process adjustments*** may include:

- flow rate
- chlorine feed rate
- ammonia feed rate

## RANGE STATEMENT

- Chemicals* may include:
- chlorine to ammonia ratio
  - calibration of chemical dosing equipment.
  - liquefied chlorine gas
  - sodium hypochlorite
  - anhydrous ammonia
  - aqua ammonia
  - pH correcting chemicals such as lime soda ash, sodium hydroxide.
- Reports* may include:
- organisational reports
  - environmental reports
  - chemical usage
  - plant performance data.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

# NWP367A Monitor, operate and control activated carbon adsorption processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the monitoring, operational coordination and control, measurement and reporting of activated carbon adsorption system performance and process quality control.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that activated carbon adsorption processes conform to organisational standards and comply with statutory requirements

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Monitor activated carbon adsorption plant performance.</b>	1.1 Monitor <i>processes</i> to maintain the parameters of operation. 1.2 Identify and report process faults and the operational condition of plant according to <i>organisational and statutory requirements</i> . 1.3 Adjust integrated processes to optimise system performance according to organisational requirements.
<b>2 Operate and control activated carbon adsorption processes.</b>	2.1 Carry out <i>routine plant inspections</i> according to organisational and plant requirements. 2.2 Conduct and analyse <i>process tests</i> and determine performance against plant operational requirements. 2.3 Collect, interpret and record process data according to organisational and plant requirements. 2.4 Conduct calculations to determine process performance. 2.5 Make <i>process adjustments</i> to optimise system performance according to organisational requirements.
<b>3 Compile activated carbon adsorption process records.</b>	3.1 Compile reports from plant and system data to meet organisational requirements. 3.2 Report observations outside defined parameters for further action.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and correct operational problems
- produce reports and logs
- use safety and personal protective equipment
- interpret plans, charts and instructions
- perform work related calculations
- interpret policies, procedures and standards
- communicate with employees and/or customers
- work effectively as part of a team
- use communication equipment
- give and receive instructions
- determine process requirements
- operate control equipment
- collect samples and conduct tests.

#### **Required knowledge:**

- process layout
- activated carbon adsorption principles
- powdered activated carbon
- granular activated carbon
- biological activated carbon
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling
- material safety data sheets
- risk factors and potential hazards associated with activated carbon processes
- equipment operation, capacity and limitations
- mechanical and electrical control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor, operate and control activated carbon adsorption processes including:

- analysing tests
- identifying and reporting process and operational faults
- monitoring activated carbon systems
- making appropriate system adjustments
- collecting and reporting process data.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

## EVIDENCE GUIDE

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Processes*** may include:
- pre-treatment, for example:
  - screening
  - pH correction
  - ozone
  - powdered activated carbon (PAC)
  - granular activated carbon (GAC)
  - biological activated carbon (BAC).
- Organisational and statutory requirements*** may include:
- by-laws and organisational policies
  - standard operating procedures
  - environment protection
  - occupational health and safety
  - chemicals
  - dangerous goods
  - electrical
  - lifts and cranes
  - World Health Organisation standards
  - Australian Drinking Water Guidelines
  - licensing agreements.
- Routine plant inspections*** may include:
- interaction and communication with other employees, other authorities and the general public
  - visual observation
  - implementation of reporting procedures that may also include procedures for the implementation of by-laws, organisational policies and statutory requirements.
- Process tests*** may include:
- jar testing investigations for PAC
  - odour analysis
  - UV<sub>254</sub> absorbance
  - microbiological analysis
  - adsorption capacity.
- Process adjustments*** may include:
- hydraulic loadings
  - backwash rates
  - powdered activated carbon dosages and addition points.



**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Treatment

## **NWP368A Respond to blue green algae incidents**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to respond to blue green algae blooms. The ability to identify problems, determine and apply technical adjustments and produce technical reports are essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for operational staff with a specific responsibility for ensuring that water and/or wastewater quality conforms to organisational standards and complies with statutory requirements.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Confirm blue green algae outbreaks.</b>	<p>1.1 Receive and confirm reports of blue green algal bloom in accordance with <b><i>organisational and statutory requirements</i></b>.</p> <p>1.2 Verify the extent and locations of blue green algae outbreaks.</p>
<b>2 Respond to blue green algae incidents.</b>	<p>2.1 Evaluate potential blue green algae <b><i>control methods</i></b> and select and implement appropriate actions according to organisational procedures.</p> <p>2.2 Collect, interpret and report <b><i>process data</i></b> according to organisational and plant requirements.</p> <p>2.3 Implement <b><i>response plans</i></b> according to organisational requirements.</p>
<b>3 Compile blue green algae reports.</b>	<p>3.1 Compile <b><i>reports</i></b> to meet organisational requirements.</p> <p>3.2 Report observations outside defined parameters for further action.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- identify and respond to blue green algae problems
- produce reports and logs
- use safety and personal protective equipment
- interpret instructions
- interpret policies, procedures and standards
- communicate with employees and/or customers
- use communication equipment
- give and receive instructions
- work effectively as part of a team
- determine process requirements
- operate control equipment
- perform system calculations.

#### **Required knowledge:**

- characteristics of blue green algae
- problems caused by blue green algae blooms
- methods of blue green algae control
- strategy and emergency planning
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- hazardous materials handling for algicides
- material safety data sheets
- impact of blue green algae on water and/or wastewater treatment processes
- risk factors and potential hazards
- equipment operation, capacity and limitations.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement response plans and report blue algae incidents according to organisational and statutory requirements.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

## **EVIDENCE GUIDE**

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Control methods*** may include:

- use of alternative water supplies
- changes to off take levels
- flow and water level control
- land utilisation of wastewater effluent
- mixing
- scum barriers
- mechanical removal processes
- micro straining
- dissolved air flotation
- chemical treatment
- activated carbon
- algicides
- nutrient removal
- oxidation.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures including for:
  - chemicals
  - dangerous goods
  - lifts and cranes
  - environment protection
  - occupational health and safety, including use of personal protective equipment
  - Australian Drinking Water Guidelines
  - National Water Quality Management strategy
  - World Health Organisation standards
  - licensing agreements
  - Environment Protection Authority regulations.

***Process data*** may include:

- cell counts
- blue green algae type
- toxicity
- odour
- location of bloom
- water clarity
- flow rates.

## **RANGE STATEMENT**

*Response plans* may include:

- contingency plans
- nutrient control plans
- emergency management plans.

*Reports* may include:

- organisational reports:
- alert levels
- government agencies
- water users/special consumers
- media
- environmental reports
- chemical usage
- plant performance data.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Treatment



## **NWP401B Coordinate and monitor the application of environmental plans and procedures**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor and coordinate the application of environmental plans and procedures to specific projects and to develop environmental procedures for the local work area.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for ensuring that all relevant environmental plans and policies are applied to each project and work site within the scope of their job role; and for ensuring that environmental plans and policies are implemented, monitored, reviewed and reported according to organisational and statutory requirements.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Determine relevant environmental plans and procedures.</b>	1.1 Identify <i>environmental plans and procedures</i> and determine relevance to <i>specific projects or work sites</i> . 1.2 Interpret relevant environmental plans and procedures in relation to specific project or site activities.
<b>2 Implement environmental plans and procedures.</b>	2.1 Identify <i>environmental risks and impacts</i> . 2.2 Manage and minimise environmental risks. 2.3 Apply emergency procedures. 2.4 Carry out activities according to environmental plans and procedures. 2.5 Maintain effective participation and contribution.
<b>3 Develop project or site specific environmental procedures.</b>	3.1 Assess the need for project or site specific environmental procedures. 3.2 Consult <i>stakeholders</i> and address issues and concerns. 3.3 Develop specific project or site environmental procedures. 3.4 Review and report specific project or site environmental procedures according to <i>organisational procedures and statutory requirements</i> .
<b>4 Control environmental incidents.</b>	4.1 Identify environmental incidents and apply appropriate control measures. 4.2 Analyse environmental incidents to prevent recurrence. 4.3 Record and report environmental incidents and complete <i>environmental management documentation</i> according to organisational requirements.
<b>5 Monitor and report on environmental plans and procedures.</b>	5.1 Monitor and report the implementation of environmental plans and procedures according to organisational requirements. 5.2 Report environmental risks according to organisational procedures. 5.3 Ensure participation by the relevant work force in reviews of environmental procedures and report according to organisational requirements.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- apply control procedures at environmental risks and incidents
- access, interpret and apply relevant legislation and standard operating procedures
- assess environmental risks at the specific project or site
- apply environmental plans and procedures
- report and record environmental procedures
- develop local workplace environmental procedures
- identify risks and impacts
- apply consultation processes
- manage environmental incidents
- conduct environmental audits
- apply due diligence
- monitor a specific project or site
- identify possible cultural or heritage sites
- identify potential pollutants
- analyse personal and team performance against work objectives
- solve operational problems.

#### **Required knowledge:**

- relevant legislative requirements
- standard operating procedures
- environmental plans and procedures
- sedimentation and erosion control
- risk assessment procedures
- rare and endangered plants
- recording procedures
- reporting procedures
- monitoring procedures
- identification of risks and impacts
- consultation procedures
- incident management procedures
- potential environmental risks and incidents
- disposal of dangerous and contaminated soils
- environmental auditing
- concepts of due diligence
- principles of environmental protection
- endangered species and habitat protection

## **REQUIRED SKILLS AND KNOWLEDGE**

- environmental impact assessment
- control procedures for environmental risks and incidents
- waste management.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to coordinate and monitor the application of environmental plans and procedures including:

- identifying and analysing environmental plans and procedures relevant to a representative variety of projects and work sites
- interpreting and implementing relevant environmental plans and procedures for a typical project or work site
- developing site- or project-specific environmental plans and procedures for an atypical project or work site, including consultation with stakeholders
- managing environmental incidents
- monitoring, reporting and reviewing the implementation of environmental plans and procedures
- coordinating participation by relevant sectors of the workforce.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Environmental plans and procedures*** may include:

national, state or local government policies or local government or regional development plans concerning:

- water resources
- industry and cross industry issues
- business, corporate or enterprise issues
- cultural and heritage issues
- conservation
- flora and fauna
- waste disposal
- coastal protection
- groundwater protection
- irrigation
- salination control
- pollution and litter control
- river and surface water systems
- chemical management
- biological control
- organisational procedures, including:
  - minimisation of waste materials
  - proper disposal of waste materials
  - restriction of burning off
  - correct handling of toxic substances
  - containment of chemicals such as chlorofluorocarbons
  - minimisation of factors that contribute, directly or indirectly, to the production of greenhouse gases
  - correct use of enterprise vehicles and machinery
  - reuse or recycling of trade materials where possible
  - overall reduction of energy usage through general awareness and the use of appropriate technologies.
- buildings
- plants
- construction and maintenance sites
- workshops
- laboratories

***Specific projects or work sites*** may include:



## RANGE STATEMENT

***Environmental risks and impacts*** may include:

- bulkwater storage sites
- surface or groundwater sites
- catchments
- flood plains irrigation sites
- wetlands
- drainage sites
- waste disposal sites.
- risks, including:
  - impact of mismanagement of chemicals
  - impact of mismanagement of biological agents
  - detrimental impact on limited water resources
  - spillage
  - waste disposal
  - detrimental impact on water catchment areas (urban and non-urban)
  - detrimental impact on rivers, waterways and channels
  - unsatisfactory water and wastewater treatment processes
  - unsatisfactory trade waste treatment and disposal processes
  - poor construction processes
  - planning deficiencies
  - incidents of environmental impact, including:
    - emissions to air
    - releases to/of water
    - releases to land
    - vibration and noise
    - disposal of waste
    - contamination of land
    - impact on communities
    - destruction of habitat
    - use of energy sources
    - waste generation processes and technologies
    - impact on culturally significant sites
  - incidents may involve the implementation of emergency responses.

***Stakeholders*** may include:

- the enterprise
- all levels of government
- industry (eg extractive, other utilities, manufacturing)
- community action groups
- environmental conservation groups
- land care groups

## RANGE STATEMENT

- Organisational and procedures and statutory requirements* may include:
- primary producers
  - the general community and individuals
  - Indigenous and Torres Strait Islander groups.
  - environmental legislation, including:
    - relevant federal legislation
    - relevant state or territory legislation
    - relevant local government by-laws
    - relevant government and quasi government policies and regulations.
- Environmental management documentation* may include:
- information on applicable environmental laws or other requirements
  - complaint records
  - training records
  - process information
  - process operational logbooks
  - inspection, maintenance and calibration records
  - relevant contractor and supplier information
  - incident reports
  - information on emergency preparedness and response
  - records of significant environmental impacts
  - chain of custody and compliance records
  - audit results
  - management reviews.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Common

## **NWP403A Investigate and plan the optimisation of potable water distribution systems**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to coordinate, monitor and optimise system performance and maintenance planning in potable water distribution systems.

### **Application of the Unit**

**Application of the unit** This unit is required by staff with a specific responsibility for ensuring that potable water systems comply with organisational and statutory requirements. This role may be performed by a single operator or one working in a team, and may include the coordination of an operational team.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Evaluate potable water distribution system performance.</b>	<p>1.1 Review existing distribution system performance data against relevant <b><i>organisational and legislative requirements</i></b>.</p> <p>1.2 Identify the impact of the <b><i>distribution system</i></b> on water quality.</p> <p>1.3 Identify and coordinate any additional <b><i>sampling and testing</i></b> required for valid evaluation of current process performance.</p>
<b>2 Investigate water distribution system issues.</b>	<p>2.1 Review existing system fault reports and relevant water quality information.</p> <p>2.2 Identify and record links between operational problems and maintenance activities.</p> <p>2.3 Investigate the operational status of system components with reference to <b><i>manufacturers' and suppliers' specifications</i></b>.</p> <p>2.4 Carry out distribution system configuration investigations to identify <b><i>potential deficiencies</i></b>.</p>
<b>3 Plan optimisation of potable water distribution system.</b>	<p>3.1 Identify <b><i>potential hazards</i></b> to the distribution system.</p> <p>3.2 Select appropriate <b><i>preventive measures</i></b></p> <p>3.3 Develop and validate a system optimisation plan.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- investigate and report on operational and control system problems
- coordinate sampling and testing
- performs various calculations to provide data for the analysis and development of options and solutions
- interpret plans, charts and instructions
- operate control and communication systems
- use safety and personal protective equipment
- communicate with colleagues, consultants and suppliers
- produce optimisation reports
- interprets a range of complex and technical documents, including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - industry codes and standards
  - specifications
  - organisational policies
- articulate complex ideas clearly
- analyse and evaluate reports and reference materials
- work collaboratively with relevant stakeholders
- analyse problems and recommend appropriate remedial solutions
- identify risks and hazards
- identify opportunities for improved distribution system management
- participate in the provision of appropriate information to inform workplace processes
- manage work priorities.

#### Required knowledge:

- Australian Drinking Water Guidelines
- water quality parameters
- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- operations and maintenance policies and procedures
- occupational health and safety and environmental legislation, Acts and procedures
- environmental management procedures
- control procedures for environmental risks and incidents
- system hydraulics

## **REQUIRED SKILLS AND KNOWLEDGE**

- incident management processes
- system layout
- system processes
- system operation
- water main isolation procedures
- sampling and testing procedures
- safety procedures
- lock out procedures for mechanical and electrical installations
- policies, standard operating procedures and legislation
- relevant utilities and service bodies
- communication systems
- risk management principles
- risk factors and potential hazards involved in water systems
- equipment operation, capacity and limitations of control systems.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to optimise system performance and maintenance planning in potable water distribution systems including:

- assessing distribution system performance and impacts on water quality
- investigating system faults and deficiencies and assessing the status of system components
- conducting hazard assessment and proposing prevention strategies
- producing and monitoring a potable water distribution system optimisation plan.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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.

***Organisational or legislative requirements*** may be determined by:

- federal, state and local environmental and water quality legislation and guidelines
- organisational policies
- standard operating procedures
- communication and reporting protocols
- quality assurance standards and processes.

***Distribution system*** may include:

- pipes
- hydrants
- valves
- backflow prevention devices
- service reservoirs
- chlorinators.

***Sampling*** may include:

- frequency of sampling
- bacteriological samples
- grab samples from:
  - mains
  - customer taps
  - service reservoirs
  - high-risk user facilities.

***Testing*** may include:

- microbiological testing
- levels of manganese and iron
- turbidity
- colour
- taste and odour
- copper
- pH
- chlorine residuals
- hardness
- presence of disinfection by-products.

***Manufacturers' and designers' specifications*** may include:

- valve installation and operation
- hydrant installation and operation
- pipe pressure specifications
- calibration and operation of inline equipment.

## RANGE STATEMENT

- Potential deficiencies* may include:
- low pressure areas
  - dead ends
  - low flow areas
  - backflow
  - cross connections
  - uncovered or unsecured service reservoirs
  - leaks
  - loss of disinfectant residual.
- Potential hazards* may include:
- microbiological contamination of water
  - waterborne disease outbreaks
  - metal poisoning
  - pressure for fire fighting appliances.
- Preventive measures* may include:
- maintenance of disinfection residuals
  - maintenance of adequate system pressure
  - minimise hydraulic detention time
  - flushing, scouring and swabbing.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# NWP404A Apply principles of chemistry to water systems and processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the knowledge required to identify and apply the principles of chemistry to water systems and processes, and to select the relevant and effective chemicals required for specific processes.

## Application of the Unit

**Application of the unit** This unit is relevant to a wide range of job roles within the water industry and is fundamental to all quality monitoring and treatment processes.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Apply chemistry to water processes.</b>	<p>1.1 Identify and apply <b><i>concepts of chemistry</i></b> to the performance of water processes according to <b><i>relevant legislation</i></b> and <b><i>workplace policies and procedures</i></b>.</p> <p>1.2 Identify and explain <b><i>chemical reactions</i></b> specific to water processes.</p>
<b>2 Identify the use of chemicals in water industry processes.</b>	<p>2.1 Assess the <b><i>functions</i></b> of the range of industry <b><i>chemicals</i></b> in relation to their use in water processes.</p> <p>2.2 Identify and explain <b><i>factors influencing the effectiveness of chemical use</i></b>.</p> <p>2.3 Store, handle and prepare chemicals according to workplace policies and procedures and manufacturers' specifications.</p>
<b>3 Select chemicals for specific water industry processes.</b>	<p>3.1 Identify the range of chemicals available for specific water industry processes.</p> <p>3.2 Evaluate the <b><i>factors affecting the selection of chemicals</i></b> for particular water industry applications.</p> <p>3.3 Select suitable chemicals and calculate correct usage for a range of specific water industry processes.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- interpret a range of complex and technical documents including relevant:
- regulatory, legislative, licensing and organisational requirements
- codes and standards
- specifications
- organisational policies
- communicate effectively with a range of relevant parties
- articulate complex ideas clearly
- analyse and evaluate reports and reference materials
- work collaboratively with relevant stakeholders
- analyse problems and apply effective remedial solutions
- perform various calculations to provide data for the analysis and development of options and solutions
- identify risks and hazards
- identify opportunities for improved water management
- participate in the provision of information to inform workplace processes
- manage work priorities
- use information effectively to improve work performance.

#### Required knowledge:

- standards and workplace policies and procedures determining the use and management of chemical processes
- chemical concepts relevant to water industry processes
- chemical reactions
- the range and characteristics of chemicals used in various water industry processes
- the functions of various chemicals in water industry processes
- factors influencing the effectiveness of chemicals
- the factors affecting the selection of chemicals.

# 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

The candidate should:

- perform each task outlined in the elements consistently and in a representative range of contexts required by the enterprise and worksite
- meet the performance criteria associated with each element by employing the techniques, procedures, information and resources available in the workplace from those listed in the range statement
- demonstrate an understanding of the underpinning knowledge and the application of skills as described in the required skills and knowledge section.

### Critical aspects for assessment and evidence required to demonstrate competency in this unit

The candidate should demonstrate the ability to:

- understand and apply a knowledge of chemical concepts and reactions relevant to water industry processes
- describe the range, characteristics and functions of chemicals used in various water industry processes
- identify and evaluate the factors influencing the effectiveness of chemicals in specific water industry processes
- select appropriate chemicals for specific water industry processes.

### Context of and specific resources for assessment

Access to the workplace and resources, including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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.

- Concepts of chemistry*** may include:
- atoms, ions, molecules and compounds
  - chemical bonding
  - chemical reactions
  - acids and bases
  - oxidation reduction potential (ORP).
- Workplace policies and procedures*** may include:
- organisational policies
  - standard operating procedures
  - communication and reporting protocols
  - quality assurance.
- Relevant legislation*** may include:
- federal, state and local environmental and water quality legislation
  - occupational health and safety legislation
  - hazardous chemicals and dangerous goods legislation.
- Chemical reactions*** may include:
- neutralization and pH buffering
  - pH correction
  - calcium carbonate precipitation
  - coagulation
  - chemical P removal
  - iron and manganese removal
  - sequestering.
- Functions*** may include:
- disinfectant
  - oxidant
  - reductant
  - sequestering agent
  - pH correction and buffering
  - coagulant
  - flocculant
  - surfactant
  - adsorbent
  - precipitant
  - catalyst.
- Chemicals*** used in the
- chlorine



## RANGE STATEMENT

water industry may include:

- ozone
- sodium thiosulphate
- sodium hexametaphosphate
- activated carbon
- hydrated lime
- aluminium and iron salts
- potassium permanganate
- sulphuric acid.

*Factors influencing the effectiveness of chemical use* may include:

- pH
- ageing
- mixing
- temperature
- concentration.

*Factors affecting the selection of chemicals* may include:

- cost
- purity
- availability
- by-product generation
- storage and handling requirements
- safety requirements
- efficiency and effectiveness.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

## **NWP406A Investigate and plan the optimisation of granular media filtration processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to evaluate and report on system performance and process quality control and may require the control and coordination of granular media filtration processes used in water and wastewater treatment.

### **Application of the Unit**

**Application of the unit** This unit is required by technical staff with responsibility for optimising granular media filtration processes in water or wastewater treatment plants. This role may include coordination or supervision of a work team, or may be performed by a single operator, depending on the size of the treatment plant. The role will be managed under indirect supervision.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1Evaluate granular media filtration process performance.</b>	<p>1.1 Review existing process performance data against relevant <b><i>organisational or legislative requirements</i></b>.</p> <p>1.2 Review existing operational <b><i>processes</i></b> with reference to <b><i>manufacturers' and plant designers' specifications</i></b>.</p> <p>1.3 Identify the impact of <b><i>incoming water quality</i></b> on granular media filtration processes as required.</p> <p>1.4 Identify and coordinate any additional sampling and <b><i>testing</i></b> required for valid evaluation of current process performance.</p>
<b>2Investigate granular media filtration plant or equipment operation.</b>	<p>2.1 Review existing fault reports and other relevant plant asset information.</p> <p>2.2 Investigate the operational status of <b><i>plant components</i></b> with reference to manufacturers' and plant designers' specifications.</p>
<b>3Investigate the operational options for process optimisation.</b>	<p>3.1 Review relevant fault and incident reports and remedial actions taken.</p> <p>3.2 Investigate current <b><i>media status</i></b> with reference to manufacturers' or plant designers' specifications.</p> <p>3.3 Investigate <b><i>potential changes to operational processes</i></b> to identify possible optimisation strategies.</p>
<b>4Develop and record a plan for process optimisation.</b>	<p>4.1 Determine plant configuration or media options and revised operational procedures for process optimisation.</p> <p>4.2 Plan a trial to test the performance of the determined optimisation options.</p> <p>4.3 Compile a report making recommendations on optimisation options.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- conduct system investigation and report on operational or control system problems
- coordinate filter inspection, sampling and testing
- conduct trend analysis for long term filter monitoring
- perform calculations to provide data for the analysis and development of options and solutions, such as backwash rates and filtration rates
- determine filter run and backwash profiles and times
- operate control and communication systems
- use safety and personal protective equipment
- communicate with colleagues, consultants and suppliers
- produce optimisation reports
- interpret a range of complex and technical documents, including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - organisational policies
- articulate complex ideas clearly
- work collaboratively with relevant stakeholders and team members
- analyse problems and recommend appropriate remedial solutions
- identify risks and hazards
- identify opportunities for improved water management
- participate in the provision of appropriate information to inform workplace processes
- manage work priorities
- use information effectively to improve work performance.

#### Required knowledge:

- principles that form the basis of granular media filtration processes
- environmental legislation requirements for water quality and environmental protection
- types of filters and their range of applications, conditions for use and manufacturers' requirements
- backwash principles and optimisation
- filter run profiles
- the range and performance of filter aids
- filter media properties and selection
- filter inspection and sampling
- principles of filter maintenance, including cleaning filters, double backwashes, surface cleaning, lancing, caustic washing
- filter ripening and turbidity breakthrough

## **REQUIRED SKILLS AND KNOWLEDGE**

- pilot filters
- system layout
- pumping and valving systems
- control and communication systems
- relevant historical records
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- relevant standards and workplace 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to evaluate and report on system performance and process quality control including:

- reviewing existing filtration process performance with reference to historical data, initial specifications and differences in incoming water quality
- identifying data deficiencies and organising additional data collection through appropriate sampling and testing
- assessing faults and incident reports and investigating the status of filtration plant components and media
- investigating potential changes to filtration operational processes to identify possible optimisation strategies
- planning trials to test the performance of the determined filtration optimisation options and compiling reports making recommendations.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's

## EVIDENCE GUIDE

competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Organisational or legislative requirements*** may include:

- organisational performance quality standards
- standard operating procedures
- quality assurance guidelines
- federal, state and local environmental and water quality legislation
- occupational health and safety requirements
- water quality standards and guidelines.

***Processes*** may include:

- slow granular media filters
- conventional granular media filters
- pressure and gravity granular media filters.

***Manufacturers' and plant designers' specifications*** may include:

- filtration rates
- backwash rate and time
- air scour rate and time
- media profile
- media depth
- blower capacity
- filter aid addition
- intended plant configuration.

***Incoming water quality*** may include:

- turbidity
- colour
- presence of algae
- temperature.

***Testing*** may include:

- turbidity
- true colour
- filter run profile
- particle counting
- headloss
- media expansion rates
- solids retention profile.

***Plant components*** may include:

- valves
- blower
- wash water troughs



## RANGE STATEMENT

- under drain system
  - nozzles and air scour components
  - control systems
  - filter cell
  - surface washers
  - turbidity meter
  - particle counter.
- Media status* may include:
- regularity of surface
  - media profile
  - media depth
  - media uniformity
  - solids retention profile
  - presence of contaminants.
- Potential changes to operational processes* may include:
- backwash rates, times and sequence
  - filtration rates
  - air scour rate and time
  - filter aid addition
  - storage of offline filters.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field Treatment

## **NWP407A Investigate and plan the optimisation of dissolved air flotation processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to evaluate system performance and investigate and report on optimisation of dissolved air flotation (DAF) processes.

### **Application of the Unit**

**Application of the unit** This unit is required by technical staff in water treatment with a specific responsibility for optimising dissolved air flotation (DAF) processes in water or wastewater treatment plants. This role may be performed as a single operator or as part of a team with some responsibility for team coordination and supervision depending on the size of the treatment plant.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1Evaluate dissolved air flotation process performance.</b>	<p>1.1 Review existing process performance data against relevant <b><i>organisational or legislative requirements</i></b>.</p> <p>1.2 Review existing operational <b><i>processes</i></b> with reference to <b><i>manufacturers' or plant designers' specifications</i></b>.</p> <p>1.3 Identify the impact of <b><i>incoming waterquality</i></b> on dissolved air flotation processes as required.</p> <p>1.4 Identify and coordinate any additional sampling and <b><i>testing</i></b> required for valid evaluation of current process performance.</p>
<b>2Investigate dissolved air flotation asset operation.</b>	<p>2.1 Review existing fault reports and other relevant plant asset information.</p> <p>2.2 Evaluate the operational status of <b><i>plant components</i></b> against manufacturers' and plant designers' specifications.</p>
<b>3Investigate options for process optimisation.</b>	<p>3.1 Review relevant fault and incident reports and take remedial actions.</p> <p>3.2 Investigate <b><i>potential changes to operational processes</i></b> to identify possible optimisation strategies.</p>
<b>4Plan process optimisation.</b>	<p>4.1 Determine plant configuration and revised operational processes for process optimisation.</p> <p>4.2 Plan a trial to test the performance of the determined optimisation options.</p> <p>4.3 Compile a report making recommendations on optimisation options.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- conduct treatment system investigations and report on operational or control system problems
- coordinate DAF inspection, sampling and testing
- perform calculations to provide data for the analysis and development of options and solutions, such as hydraulic and solids loading rates, recycle ratios and air loading
- operate control and communication systems
- use safety and personal protective equipment
- communicate with colleagues, consultants and suppliers using clear and direct communication to identify and confirm requirements and concepts
- produce optimisation reports
- interpret a range of complex and technical documents, including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - organisational policies
- articulate complex ideas clearly
- use mathematical calculations to analyse options and solutions
- work collaboratively with relevant stakeholders
- analyse problems and recommend appropriate remedial solutions
- identify risks and hazards
- identify opportunities for improved water management
- participate in the provision of appropriate information to inform workplace processes
- manage work priorities
- use information effectively to improve work performance
- prepare and apply chemical dosing.

#### Required knowledge:

- principles that form the basis of dissolved air flotation processes
- types of dissolved air flotation processes
- polymers
- principles of DAF system maintenance
- system layout
- pumping and valving systems
- relevant historical records
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles related to dissolved air flotation processes

## **REQUIRED SKILLS AND KNOWLEDGE**

- relevant legislation, standards and workplace policies and procedures.
- chemicals used for coagulation and flocculation or thickening
- chemical dosing processes.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to evaluate system performance and investigate and report on optimisation of dissolved air flotation (DAF) processes including:

- reviewing existing DAF process performance with reference to historical data, differences in incoming water quality and plant configuration
- identifying data deficiencies and organising additional data collection through appropriate sampling and testing
- assessing fault reports and investigating the current operational status of DAF plant components
- investigating potential changes to DAF operational processes to identify possible optimisation strategies
- planning trials to test the performance of the determined DAF optimisation options and compiling reports making recommendations.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's

## EVIDENCE GUIDE

competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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.

- Organisational or legislative requirements*** may include:
- organisational performance quality standards
  - standard operating procedures
  - quality assurance guidelines
  - federal, state and local environmental and water quality legislation
  - occupational health and safety requirements
  - water quality standards and guidelines.
- Processes*** may include:
- dissolved air flotation
  - dissolved air flotation filtration (DAFF)
  - dissolved air flotation sludge thickening.
- Manufacturers' and plant designers' specifications*** may include:
- hydraulic loading rate
  - air loading
  - recycle flow rates
  - saturated pressure
  - detention time
  - float removal frequency
  - intended plant configuration.
- Incoming water quality*** may include:
- turbidity
  - colour
  - presence of algae
  - temperature.
- Testing*** may include:
- turbidity
  - true colour
  - float solids content.
- Plant components*** may include:
- valves
  - recycle pumps
  - compressor
  - saturator
  - float removal mechanism
  - dispersion valves
  - cutting sprays.
- Potential changes to***
- saturator pressure



## **RANGE STATEMENT**

*operational processes* may include:

- recycle ratio
- flow rate
- polymer addition
- float removal frequency.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field** Treatment

## **NWP408A Investigate and plan the optimisation of sedimentation and clarification processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to evaluate system performance and investigate and report on optimisation of sedimentation and clarification processes.

### **Application of the Unit**

**Application of the unit** This unit is required by technical staff with responsibility for optimising sedimentation and clarification processes in water and wastewater treatment plants. This role may be a single operator or may be performed as part of a team with some responsibility for team coordination and supervision depending on the size of the treatment plant.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1Evaluate sedimentation and clarification process performance.</b>	<p>1.1 Review existing process performance data against relevant <b><i>organisational or legislative requirements</i></b>.</p> <p>1.2 Identify the impact of changing <b><i>incoming water quality</i></b> on sedimentation and clarification <b><i>processes</i></b> in a range of conditions.</p> <p>1.3 Identify and coordinate any additional sampling and <b><i>testing</i></b> required for valid evaluation of current process performance.</p>
<b>2Investigate sedimentation and clarification assets.</b>	<p>2.1 Review existing fault reports and other relevant plant asset information.</p> <p>2.2 Investigate the operational status of <b><i>plant components</i></b> with reference to <b><i>manufacturers' and plant designers'</i></b> specifications.</p>
<b>3Investigate process optimisation.</b>	<p>3.1 Review relevant fault and incident reports and remedial actions taken.</p> <p>3.2 Investigate <b><i>potential changes to operational processes</i></b> to identify possible optimisation strategies.</p>
<b>4Plan process optimisation.</b>	<p>4.1 Determine plant configuration and revised operational processes for process optimisation.</p> <p>4.2 Plan a trial to test the performance of the determined optimisation options.</p> <p>4.3 Compile a report making recommendations on optimisation options.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- conduct investigations and report on operational or control system problems
- coordinate sedimentation and clarification inspection, sampling and testing
- perform various calculations to provide data for the analysis and development of options and solutions, such as surface loading rate, upflow velocity, detention time and weir loading rate
- operate control and communication systems
- use safety and personal protective equipment
- communicate with colleagues, consultants and suppliers
- produce optimisation reports
- interpret a range of complex and technical documents, including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - organisational policies
- articulate complex ideas clearly
- work collaboratively with relevant stakeholders and team members
- analyse problems and recommend appropriate remedial solutions
- identify risks and hazards
- identify opportunities for improved water management
- participate in the provision of appropriate information to inform workplace processes
- manage work priorities
- use information effectively to improve work performance.
- prepare and apply chemical dosing.

#### Required knowledge:

- principles that form the basis of sedimentation and clarification processes
- types of sedimentation and clarification processes
- re-establishing sludge blankets
- polymers and weighting agents
- principles of sedimentation and clarification system maintenance
- system layout
- pumping and valving systems
- relevant historical records
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles related to sedimentation and clarification systems

## **REQUIRED SKILLS AND KNOWLEDGE**

- relevant legislation, standards and workplace policies and procedures
- chemical dosing processes.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to evaluate system performance and investigate and report on optimisation of sedimentation and clarification processes including:

- reviewing existing sedimentation and clarification process performance with reference to historical data, differences in incoming water quality and plant configuration
- identifying data deficiencies and organising additional data collection through appropriate sampling and testing
- assessing fault reports and investigating the current operational status of sedimentation and clarification plant components
- investigating current and potential chemical addition practices
- planning trials to test the performance of the determined sedimentation and clarification optimisation options and compiling reports making recommendations.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Organisational or legislative requirements*** may include:

- organisational performance quality standards
- standard operating procedures
- quality assurance guidelines
- federal, state and local environmental and water quality legislation
- occupational health and safety requirements
- water quality standards and guidelines.

***Incoming water quality*** may include:

- turbidity
- colour
- presence of algae
- temperature.

***Processes*** may include:

- sludge blanket clarifiers
- conventional clarifiers
- tube settlers
- high rate plate settlers
- recirculating contact clarifiers
- pulsator clarifiers
- ballasted sedimentation.

***Testing*** may include:

- turbidity
- true colour
- float solids content.

***Plant components*** may include:

- valves
- sludge pumps
- impellers
- sludge collection cones
- sludge rake
- tube and plate settlers
- weirs or launders
- dosing points.

***Manufacturers' and plant designers' specifications*** may include:

- surface loading rate
- upflow velocity
- detention time



## RANGE STATEMENT

- Potential changes to operational processes* may include:
- weir loading rate
  - slurry recirculation rate
  - intended plant configuration.
  - flow rate
  - polymer addition
  - slurry recirculation rate
  - sludge wasting rate
  - sludge blanket concentration and depth.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

## **NWP409A Investigate and plan to optimise the operation of chemical addition processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to review, coordinate and optimise chemical addition processes and to evaluate and report on system performance and process quality control.

### **Application of the Unit**

**Application of the unit** This unit is required by technical staff with a responsibility for optimising chemical addition processes in water, wastewater and stormwater treatment plants and processes. This role may be a single operator or may be performed as part of a team with some responsibility for team coordination and supervision depending on the size of the treatment plant.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1Evaluate coagulation and flocculation process performance.</b>	1.1 Review existing process performance data against relevant <b><i>organisational and legislative requirements.</i></b> 1.2 Identify the impact of <b><i>changing raw water quality</i></b> on chemical addition processes as required. 1.3 Identify and coordinate any additional sampling and <b><i>testing</i></b> required for valid evaluation of current process performance.
<b>2Investigate chemical addition plant configuration.</b>	2.1 Review existing fault reports and other relevant plant asset information. 2.2 Investigate the operational status of <b><i>plant components</i></b> with reference to <b><i>manufacturers' and plant designers' specifications.</i></b> 2.3 Carry out <b><i>plant configuration</i></b> investigations to identify potential deficiencies.
<b>3Investigate chemical options for process optimisation.</b>	3.1 Review current chemical addition practices with reference to organisational procedures to identify potential deficiencies. 3.2 Investigate dosing options for current <b><i>chemicals.</i></b> 3.3 Identify and investigate new or additional chemicals and related dosing options.
<b>4Develop and record a plan for process optimisation.</b>	4.1 Determine plant configuration or chemical options for process optimisation. 4.2 Plan a trial to test the performance of the determined optimisation options. 4.3 Compile report with recommendations on optimisation options.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- investigate and report on operational and control system problems
- coordinate sampling and testing
- conduct a full range of jar tests covering various water quality scenarios
- perform mathematical calculations to provide data for the analysis and development of options and solutions
- investigate chemical dosing
- interpret plans, charts and instructions
- operate control and communication systems
- use safety and personal protective equipment
- communicate with colleagues, consultants and suppliers
- produce optimisation reports
- interpret a range of complex and technical documents, including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - organisational policies
- articulate complex ideas clearly
- analyse and evaluate reports and reference materials
- work collaboratively with relevant stakeholders and team members
- analyse problems and recommend appropriate remedial solutions
- identify and respond to risks and hazards
- identify opportunities for improved water management
- participate in the provision of appropriate information to inform workplace processes
- manage work priorities
- use information effectively to improve work performance.

#### Required knowledge:

- the role of chemical addition in water treatment
- the principles of chemical addition, including enhanced coagulation
- chemical addition plant and equipment and system layout
- chemical concepts and reactions relevant to chemical addition processes, including pH and alkalinity
- the range and characteristics of chemicals used in chemical addition processes
- the functions of various chemicals in chemical addition processes
- factors influencing the effectiveness of chemicals in chemical addition processes
- the factors affecting the selection of chemicals in chemical addition processes

## **REQUIRED SKILLS AND KNOWLEDGE**

- relevant historical records
- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principle
- customer expectations and requirements
- occupational health and safety and environmental legislation
- relevant legislation, standards and workplace 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to review, coordinate and optimise chemical addition processes including:

- reviewing existing process performance with reference to historical data, differences in raw water quality and plant configuration
- identifying data deficiencies and organising additional data collection through appropriate sampling and testing
- assessing fault reports and investigating the current operational status of plant components
- investigating current and potential chemical addition practices
- planning trials to test the performance of the determined optimisation options and compiling reports making recommendations.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's

## EVIDENCE GUIDE

- competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
  - where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
  - assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Organisational or legislative requirements*** may include:

- organisational performance quality standards
- standard operating procedures
- quality assurance guidelines
- federal, state and local environmental and water quality legislation
- occupational health and safety requirements
- water quality standards and guidelines.

***Changing raw water quality*** may include:

- pH
- turbidity
- colour
- presence of algae
- temperature.

***Testing*** may include:

- jar testing
- flocculation growth
- mixing energy
- UV absorbance
- pH
- colour
- turbidity
- residual aluminium or iron
- quality of treatment chemicals.

***Plant components*** may include:

- mixing equipment
- streaming current detector
- dosing pumps
- chemical injection equipment
- turbidity meter
- particle counter.

***Manufacturers' and plant designers' specifications*** may include:

- dosing pump capacity and calibration charts
- detention times
- mixing intensity for flash or rapid mixing and flocculation.

***Plant configuration*** may

- location of chemical dosing points
- mixing or reaction detention times



## RANGE STATEMENT

include:

- type of mixer or impeller.

*Chemicals* may include:

- Polyaluminium chloride (PACL)
- aluminium sulphate
- aluminium chlorohydrate (ACH)
- ferric chloride
- ferric sulphate
- polyDADMAC
- polyacrylamide
- sulphuric acid
- hydrated lime
- caustic soda.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

# NWP410C Coordinate and monitor asset construction and maintenance

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to coordinate and monitor asset construction and maintenance, including site management and associated commissioning and post-commissioning activities.

## Application of the Unit

**Application of the unit** This unit is required by operators with responsibility for ensuring that asset construction and maintenance activities are performed and completed in compliance with all relevant organisational and statutory requirements. The level of responsibility may vary according to the size, scope, location, and technical complexity of individual projects.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for asset construction and maintenance.</b>	1.1 Determine <i>work requirements</i> according to asset purpose, maintenance history, components, maintenance schedules and known logistics. 1.2 Confirm maintenance plan and prioritise and schedule work. 1.3 Confirm <i>authorisations</i> and communication with stakeholders. 1.4 Identify and address <i>stakeholders</i> issues that impact on construction or maintenance. 1.5 Conduct <i>site inspections</i> according to organisational procedures and risk management guidelines.
<b>2 Undertake work site maintenance.</b>	2.1 Monitor material handling procedures according to organisational requirements. 2.2 Monitor construction activities to ensure compliance with <i>occupational health and safety and environmental regulations</i> . 2.3 Confirm maintenance requirements by detailed diagnosis of problems and conditions at the site. 2.4 Carry out <i>maintenance tasks</i> according to the condition of the equipment and organisational requirements. 2.5 Use equipment, tools and technology safely, effectively and productively.
<b>3 Test and commission work.</b>	3.1 Conduct tests and apply defined commissioning programs according to <i>organisational and manufacturers' requirements</i> . 3.2 Monitor test results to ensure that the assets function within agreed specifications. 3.3 Conduct and record inspections according to commissioning and stakeholders requirements.
<b>4 Conduct post-maintenance activities.</b>	4.1 Coordinate and monitor work site inspections and rehabilitation. 4.2 Undertake a review of the construction or installation and monitor asset performance. 4.3 Identify defects and make arrangements to rectify them. 4.4 Complete reports and documentation required by the organisation. 4.5 Store and secure reports according to information and data management system.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- interpret and make adjustments to asset maintenance plan
- monitor work progress against a plan
- apply relevant organisational procedures based on legislation, risk management, manufacturers guidelines, site conditions and quality standards
- conduct site inspections and investigations
- communicate with supervisors, team members, contractors and the public using clear and direct communication
- prepare reports for management on asset monitoring and maintenance in organisation proformas
- interpret and apply a range of organisation documents
- liaise and negotiate with local and internal stakeholders
- detect and solve operational problems within area of authority and delegation
- work within safety requirements, identify hazards and use equipment and processes safely
- use safety and personal protective equipment
- interpret policies, standard operating procedures and standards related to monitoring and maintenance of water services assets
- control system operations, processes, failure and rectification
- use required forms of transport including marine craft, 4 wheel drive vehicles, aircraft, snow mobiles based on site location and conditions and safety and equipment management procedures
- use organisation equipment, tools and technology.

#### Required knowledge:

- enterprise contract conditions and compliance
- site inspection and investigation procedures
- organisational policies, procedures, guidelines and requirements for asset monitoring and maintenance
- system layout, integrity, design and performance
- evaluation and investigation requirements
- enterprise auditing and recording procedures and reporting requirements
- characteristics, technical capabilities and limitations of materials and equipment according to manufacturers' specifications
- occupational health and safety policies and procedures including material handling procedures, use of protective equipment, safe driving in hazardous conditions, bush and water survival, working in the location of power supplies, working in confined spaces
- relevant environmental and natural resource management legislation
- risk factors and potential hazards involved with water pressures and flows.



## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to plan, coordinate and monitor the construction or maintenance of water industry assets, including:

- analysing work requirements
- prioritising and scheduling work
- liaising and negotiating with all relevant stakeholders and work teams
- planning construction or maintenance activities
- monitoring work performance for compliance with OHS and other organisational and statutory requirements
- providing technical advice on maintenance methods
- conducting risk and hazard assessments
- reporting recommendations for risk and hazard prevention
- conducting or supervising asset tests
- implementing commissioning programs and post commissioning inspections
- coordinating and monitoring the rehabilitation of the worksite
- reviewing the construction or installation and monitoring performance
- identifying and reporting defects.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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 requirements*** will include the organisation and site specific requirements including:

- purpose and history of site and its assets
- maintenance plans and specifications
- site location and conditions
- risk and hazard management procedures
- communication methods and equipment
- authorisations, permits and restrictions
- environmental and heritage conditions
- recording and reporting asset condition and maintenance
- preparing and coordinating the availability and transporting of:
  - maintenance and construction support
  - equipment and tools
  - replacement assets
  - safety and protective equipment
  - communication equipment
  - technical expertise
  - surveying equipment
  - camping and survival resources
  - rescue and retrieval resources.

***Authorisations*** may include:

- federal, state and local government
- quarantine controls
- legal access
- traffic management
- Blue Card.

***Stakeholders*** may include:

- contractors
- government and regulatory authorities
- property owners
- utility organisations
- specialised work teams
- general public
- asset users.

***Site inspections*** may

- confirmation of:
- plans

## RANGE STATEMENT

include:

- contracts
- purpose
- asset history
- fault reports
- components
- risk factors
- inspection of preparation work
- assessment of compliance with specifications and manufacturers' guidelines
- assessment of compliance with procedures and legislation including:
  - occupational health and safety requirements
  - environmental
  - natural resource management
  - water quality.

*Occupational health and safety and environmental requirements* will include:

- working with, near and in:
  - confined spaces
  - heights
  - water
  - forests
  - equipment operation
  - plant operation
  - contamination issues
  - weather exposure
  - herbicides
  - pesticides
  - solvents
  - fuels
  - PPE requirements
  - onsite communication and procedures for working remotely.
- equipment:
  - ladders
  - harness
  - trailer
- personnel safety:
  - medical constraints and conditions
  - CPR
  - First Aid
  - water survival
  - bush survival

## RANGE STATEMENT

*Maintenance tasks* will be influenced by consideration of:

- self rescue
- traffic management authority.
- performance benchmarks
- reference marks
- CTF
- relevant section:
- control
- approach
- inlet
- tailwater
- DM
- long survey
- staff gauges
- peak level indicators
- power supplies
- instrument circuits
- lightning protection
- banks
- site access
- transducer exposure.

*Organisational and manufacturers' requirements* may include:

- general and special conditions of contract and site specifications
- plans, maps and drawings
- authorisations and permits
- operational manuals
- manufacturers' manuals and specifications
- maintenance manuals
- plans of other authorities, services and utilities
- hazard and response reports
- project plans
- maintenance checklists.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Asset management

# NWP411A Select treatment requirements for waterborne microorganisms

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to identify microorganisms and assess the appropriate potable water or water reuse treatment processes for inactivation or removal.

## Application of the Unit

**Application of the unit** This unit covers generic competency for water treatment operators responsible for water quality in a range of technical and process applications in water and wastewater treatment.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Investigate waterborne microorganisms.</b>	<p>1.1 Identify the samples of <i>waterborne microorganisms</i> found in water sources.</p> <p>1.2 Identify the <i>general characteristics</i> of different types of microorganisms.</p> <p>1.3 Identify <i>water quality or treatment problems</i> caused by microorganisms.</p> <p>1.4 Identify <i>microorganisms causing problems</i> specific to water treatment processes.</p> <p>1.5 Identify the <i>characteristics of, and diseases caused by, pathogenic microorganisms</i>.</p>
<b>2 Identify processes to remove microorganisms.</b>	<p>2.1 Assess the effectiveness of a range of <i>filtration processes</i> for physically removing pathogenic microorganisms according to <i>organisational and legislative requirements</i>.</p> <p>2.2 Assess the effectiveness of a range of disinfection processes for inactivating pathogenic microorganisms according to organisational and legislative requirements.</p> <p>2.3 Identify and assess the implications of by-product formation resulting from disinfection processes.</p> <p>2.4 Assess the effectiveness of various pre- or post-treatment processes for removing microorganisms, or their metabolites, causing nuisance and toxicity problem.</p>
<b>3 Determine appropriate water treatment processes.</b>	<p>3.1 Identify optimum treatment processes for the range of microorganisms found in water sources.</p> <p>3.2 Report on effective treatment processes and associated sampling and testing requirements required to maintain water quality.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- interpret a range of complex and technical documents, including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - organisational policies
- communicate effectively with a range of relevant parties using clear and direct communication to identify and confirm requirements
- articulate complex ideas clearly
- produce reports on treatment requirements for management
- analyse and evaluate reports and reference materials
- work collaboratively with relevant stakeholders
- analyse problems and apply appropriate remedial solutions
- perform various calculations to provide data for the analysis and development of options and solutions
- identify hazards and develop appropriate responses to control and mitigate risks in accordance with regulations and legislation
- identify opportunities for improved water management
- participate in the provision of appropriate information to inform workplace processes
- understand capabilities and limitations of plant, equipment and tools
- manage work priorities
- use information effectively to improve work performance.

#### Required knowledge:

- organisational and legislative requirements relevant to water quality and treatment
- types, lifecycle, characteristics of waterborne microorganisms
- nuisance problems caused by waterborne microorganisms
- toxicity and pathogenic problems caused by waterborne microorganisms
- relevant legislation, standards and workplace policies and procedures related directly to the control and treatment of waterborne microorganisms
- principles of water or reuse treatment processes
- Ct concept
- log reduction
- properties and modes of action of disinfectants.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to identify microorganisms and assess the appropriate potable water or water reuse treatment processes for inactivation or removal including:

- identifying a range of waterborne microorganisms,
- analysing their general characteristics and the types of problems caused
- identifying pathogenic microorganisms and the diseases caused
- assessing and selecting water or reuse treatment processes for physically removing or inactivating pathogenic microorganisms, including disinfection by-product issues
- assessing and selecting pre- or post-treatment processes for removing the causes of nuisance and toxicity problems
- preparing reports on the optimum treatment for a range of microorganisms including measures to ensure validity.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water treatment organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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



## EVIDENCE GUIDE

- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Waterborne microorganisms*** may include:

- viruses
- bacteria
- protozoa
- algae
- cyanobacteria
- helminths.

***General characteristics of microorganisms*** may include:

- evolutionary development
- source
- structure
- life cycle
- growth rates and requirements.

***Water quality or treatment problems*** may include:

- nuisance problems
- taste and odour
- filter clogging
- colour
- corrosion
- toxicity problems
- pathogenic problems.

***Microorganisms causing problems*** may include:

- diatoms
- sulphur bacteria
- cyanobacteria including:
  - *Microcystis aeruginosa*
  - *Anabaena circinalis*
- Pathogenic microorganisms including:
  - viruses:
    - Enterovirus,
    - Hepatitis A,
    - Hepatitis E,
    - Rotavirus
  - bacteria:
    - *Campylobacter*
    - *Salmonella*
    - *Escherichia coli*

## RANGE STATEMENT

- protozoa species:
    - Giardia
    - Cryptosporidium
    - Naegleria
    - Helminths such as *Ascaris lumbricoides*.
- Characteristics of pathogenic microorganisms* may include:
- pathogenicity
  - virulence
  - resistance to disinfectants (Ct, log reduction)
  - opportunistic infection capability.
- Diseases caused by pathogenic microorganisms* may include:
- typhoid
  - cholera
  - ascariasis
  - hepatitis
  - giardiasis
  - cryptosporidiosis
  - gastroenteritis
  - tuberculosis.
- Filtration processes* may include:
- slow sand filter
  - granular media filters
  - membrane filters.
- Organisational and legislative requirements* may include:
- federal, state and local environmental and water quality legislation and guidelines
  - organisational policies
  - standard operating procedures
  - communication and reporting protocols
  - quality assurance.
- Disinfection processes* may include:
- chlorination
  - chloramination
  - UV
  - chlorine dioxide
  - ozone.
- Pre- or post-treatment processes* may include:
- micro-straining
  - algicides
  - activated carbon
  - ozone-biologically activated carbon (BAC).

## Unit Sector(s)

Not applicable.

## **Competency field**

**Competency field**      Treatment

# NWP412A Investigate and plan the optimisation of activated sludge processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to evaluate system performance and investigate and report on optimisation of activated sludge treatment processes in maintaining water quality.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for technical staff with a specific responsibility for optimising activated sludge treatment processes.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
1 Evaluate activated sludge treatment process performance	<p>1.1 Review existing process performance data against relevant <b><i>organisational or legislative requirements</i></b>.</p> <p>1.2 Review existing operational <b><i>processes</i></b> with reference to <b><i>manufacturers' and plant designers' specifications</i></b>.</p> <p>1.3 Identify the impact of <b><i>influent quality</i></b> on activated sludge treatment processes as required.</p> <p>1.4 Identify and coordinate any additional sampling and <b><i>testing</i></b> required for valid evaluation of current process performance.</p>
2 Investigate activated sludge treatment plant configuration	<p>2.1 Review existing fault reports and other relevant plant asset information.</p> <p>2.2 Investigate the operational status of <b><i>plant components</i></b> with reference to manufacturers' and plant designers' specifications.</p>
3 Investigate the operational options for process optimisation	<p>3.1 Review relevant fault and incident reports and remedial actions taken.</p> <p>3.2 Investigate <b><i>potential changes to operational processes</i></b> to identify possible optimisation strategies.</p>
4 Plan treatment process optimisation	<p>4.1 Determine plant configuration and revised operational processes for process optimisation.</p> <p>4.2 Plan a trial to test the performance of the determined optimisation options.</p> <p>4.3 Compile a report making recommendations on optimisation options.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- investigate and report on operational or control system problems
- coordinate activated sludge and BNR treatment process inspection, sampling and testing
- perform various calculations to provide data for the analysis and development of options and solutions, such as F:M ratio, MCRT, return and wasting rates
- operate control and communication systems
- use safety and personal protective equipment
- communicate with colleagues, consultants and suppliers
- produce optimisation reports
- interpret a range of complex and technical documents, including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - organisational policies
- articulate complex ideas clearly
- work collaboratively with relevant stakeholders
- analyse problems and recommend appropriate remedial solutions
- identify and respond to risks and hazards
- identify opportunities for improved water management
- participate in the provision of appropriate information to inform workplace processes
- manage work priorities
- use information effectively to improve work performance.
- prepare and apply chemical dosing.

#### Required knowledge:

- principles that form the basis of activated sludge treatment processes
- principles that form the basis of biological nutrient removal (BNR) activated sludge treatment processes, such as nitrification and de-nitrification, enhanced biological P removal
- types of activated sludge and BNR activated sludge treatment processes
- activated sludge and BNR microbiology
- selectors
- membrane bioreactors (MBR)
- pH and alkalinity
- pre-fermenters
- chemical and nutrient dosing requirements
- inhibitory substances
- bulking and foaming

## **REQUIRED SKILLS AND KNOWLEDGE**

- system layout
- principles of activated sludge and BNR system maintenance
- control and communication systems
- relevant historical records
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles related to activated sludge and BNR treatment processes
- relevant legislation, standards and workplace 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to evaluate system performance and investigate and report on optimisation of activated sludge treatment processes in maintaining water quality including:

- reviewing existing activated sludge or BNR treatment process performance with reference to historical data, differences in raw water quality and plant configuration
- identifying data deficiencies and organising additional data collection through appropriate sampling and testing
- assessing fault reports and investigating the current operational status of activated sludge or BNR treatment process plant components
- investigating current and potential chemical addition practices
- planning trials to test the performance of the determined activated sludge or BNR treatment process optimisation options
- preparing reports making recommendations.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

separated by further learning and practice

- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Organisational or legislative requirements*** may include:

- organisational performance standards
- standard operating procedures
- quality assurance
- federal, state and local environmental and water quality legislation.

***Processes*** may include:

- activated sludge treatment processes, such as:
- conventional or extended aeration
- contact stabilization
- high rate
- membrane bioreactor (MBR)
- intermittently decanted extended aeration (IDEA)
- sequencing batch reactor (SBR).
- Biological nutrient removal processes:
- Modified Ludzac-Ettinger (MLE)
- Bardenpho
- University of Cape Town.

***Manufacturers' and plant designers' specifications*** may include:

- food to micro-organism ratio (F:M)
- mean cell residence time (MCRT)
- detention time
- mixed liquor suspended solids (MLSS)
- Biological Oxygen Demand or Chemical Oxygen Demand removal
- nitrogen or phosphorus removal
- suspended solids removal
- intended plant configuration.

***Influent quality*** may include:

- Biological Oxygen Demand or Chemical Oxygen Demand
- pH and alkalinity
- nutrients
- total and suspended solids
- inhibitory compounds, such as heavy metals
- temperature.

***Testing*** may include:

- Biological Oxygen Demand or Chemical Oxygen Demand
- temperature

## RANGE STATEMENT

- nitrogen, such as total nitrogen, ammonia, nitrate and nitrite
  - phosphorus, such as orthophosphate and total phosphorus
  - settling tests
  - pH and alkalinity
  - microscopic observation
  - oxygen uptake rates
  - respiration rates
  - dissolved oxygen
  - redox potential
  - suspended solids, such as total and volatile.
- Plant components* may include:
- valves
  - return and wasting pumps
  - aeration equipment
  - chemical and nutrient dosing equipment
  - decanters
  - sedimentation tanks
  - on-line analysers.
- Potential changes to operational processes* may include:
- Food:Microorganism (F:M) ratio
  - Mean Cell Residues Time (MCRT)
  - Mixed Liquor Suspended Solids (MLSS)
  - return and waste activated sludge rates
  - chemical and nutrient addition
  - pre-treatment to remove inhibitory or toxic substances
  - alkalinity and pH correction
  - mixed liquor recycle rates
  - phase timing in intermittent or batch processes.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

# NWP413A Investigate and plan the optimisation of anaerobic treatment processes

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to evaluate system performance and investigate and report on optimisation of anaerobic bioreactor processes.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for technical staff with a specific responsibility for optimising mixed, fixed and suspended media anaerobic bioreactor processes in wastewater treatment plants.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
1 Evaluate anaerobic treatment process performance.	<p>1.1 Review existing process performance data against relevant <b><i>organisational or legislative requirements</i></b>.</p> <p>1.2 Review existing operational <b><i>processes</i></b> with reference to <b><i>manufacturers and plant designers' specifications</i></b>.</p> <p>1.3 Identify the impact of <b><i>incoming feed quality</i></b> on anaerobic treatment processes as required.</p> <p>1.4 Identify and coordinate any additional sampling and <b><i>testing</i></b> required for valid evaluation of current process performance</p>
2 Investigate anaerobic treatment plant configuration.	<p>2.1 Review existing fault reports and other relevant plant asset information.</p> <p>2.2 Investigate the operational status of <b><i>plant components</i></b> with reference to manufacturers' or plant designers' specifications.</p>
3 Investigate the operational options for process optimisation.	<p>3.1 Review relevant fault and incident reports and remedial actions taken.</p> <p>3.2 Investigate <b><i>potential changes to operational processes</i></b> to identify possible optimisation strategies.</p>
4 Develop and record a plan for process optimisation.	<p>4.1 Determine plant configuration and revised operational processes for process optimisation.</p> <p>4.2 Plan a trial to test the performance of the determined optimisation options.</p> <p>4.3 Compile a report making recommendations on optimisation options.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- investigate and report on operational or control system problems
- coordinate anaerobic treatment process inspection, sampling and testing
- perform mathematical calculations to provide data for the analysis and development of options and solutions, such as COD removal, volatile solids reductions and solids retention time
- operate control and communication systems
- use safety and personal protective equipment
- communicate with colleagues, consultants and suppliers
- produce optimisation reports
- interpret a range of complex and technical documents, including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - organisational policies
- articulate complex ideas clearly
- work collaboratively with relevant stakeholders
- analyse problems and recommend appropriate remedial solutions
- identify and respond to risks and hazards
- identify opportunities for improved water management
- participate in the provision of appropriate information to inform workplace processes
- manage work priorities
- use information effectively to improve work performance
- prepare and apply chemical dosing.

#### Required knowledge:

- principles that form the basis of anaerobic treatment processes
- types of anaerobic treatment processes
- anaerobic microbiology
- pH, VFA:alkalinity ratio
- nutrient requirements - macro and micro
- gas production and characterization
- inhibitory substances
- system layout
- principles of anaerobic system maintenance
- control and communication systems
- relevant historical records

## **REQUIRED SKILLS AND KNOWLEDGE**

- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles related to anaerobic treatment processes
- relevant legislation, standards and workplace policies and procedures
- chemical and nutrient dosing processes.



## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to evaluate system performance and investigate and report on optimisation of anaerobic bioreactor processes including:

- reviewing existing anaerobic treatment process performance with reference to historical data, differences in feed water quality and plant configuration
- identifying data deficiencies and organising additional data collection through appropriate sampling and testing
- assessing fault reports and investigating the current operational status of anaerobic treatment process plant components
- investigating current and potential chemical addition practices
- planning trials to test the performance of the determined anaerobic treatment process optimisation options
- preparing reports with recommendations.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Organisational or legislative requirements*** may include:

- organisational performance standards
- standard operating procedures
- quality assurance
- federal, state and local environmental and water quality legislation.

***Processes*** may include:

- upflow anaerobic sludge blanket reactors (UASB)
- fluidised bed reactors
- anaerobic digesters
- high rate anaerobic lagoons (HRAL)
- bulk volume fermenters (BVF).

***Manufacturers' and plant designers' specifications*** may include:

- organic loading rate
- solids retention time
- hydraulic loading rate
- temperature
- mixing strategy
- volatile solids reduction
- recycle flow rates
- detention time
- chemical oxygen demand (COD) removal
- volatile fatty acids to alkalinity ratio
- intended plant configuration.

***Incoming feed quality*** may include:

- chemical oxygen demand (COD)
- nutrients
- pH and alkalinity
- total and suspended solids
- salt
- inhibitory compounds, such as hydrogen sulphide or ammonia
- temperature.

***Testing*** may include:

- chemical oxygen demand (COD)
- temperature
- macro nutrients, such as nitrogen or phosphorus
- micro nutrients, such as cobalt or iron

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*Plant components* may include:

- settling tests
- pH
- redox potential
- volatile fatty acids
- alkalinity
- gas analysis
- solids.
- valves
- recycle pumps
- mixers
- covers
- inlet distribution network
- gas venting and extraction system
- chemical and nutrient dosing equipment
- solids removal launders
- sampling ports.

*Potential changes to operational processes* may include:

- recirculation rates
- addition of nutrients
- temperature
- pre-treatment to remove inhibitory or toxic substances
- alkalinity and pH correction
- flow or feed rate
- mixing rate
- sludge wastage rate.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Water treatment

## **NWP414A Select strategies to control microbial impact on wastewater treatment processes**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to identify wastewater microorganisms and select appropriate measures to optimise the growth of beneficial microorganisms.

### **Application of the Unit**

**Application of the unit** This unit is relevant to senior wastewater treatment operational specialists.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Investigate wastewater micro-organisms.</b>	<p>1.1 Identify a range of typical <i>wastewater microorganisms</i>.</p> <p>1.2 Identify the <i>general characteristics</i> of different types of microorganisms.</p> <p>1.3 Identify <i>wastewater characteristics</i> which impact on micro-organism growth.</p> <p>1.4 Identify the <i>problems caused by microorganisms</i> in specific wastewater treatment processes.</p>
<b>2 Select strategies to optimise the growth of beneficial microorganisms.</b>	<p>2.1 Investigate the cause of effluent quality issues with reference to <i>organisational and legislative requirements</i></p> <p>2.2 Investigate the operational status of the wastewater treatment process with reference to <i>manufacturers' or plant designers' specifications</i>.</p> <p>2.3 Assess the effectiveness of various <i>process control strategies</i> to optimise the growth of beneficial microorganisms and select the most appropriate method.</p>
<b>3 Identify and report on appropriate process controls.</b>	<p>3.1 Identify treatment process conditions for optimising the growth of beneficial microorganisms.</p> <p>3.2 Report on appropriate treatment processes and associated sampling and testing requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

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

#### **Required skills:**

- interpret a range of complex and technical documents, including relevant:
- regulatory, legislative, licensing and organisational requirements
- codes and standards
- specifications
- organisational policies
- communicate effectively with a range of relevant parties
- articulate complex ideas clearly
- analyse and evaluate reports and reference materials
- work collaboratively with stakeholders and team members
- analyse problems and apply appropriate remedial solutions
- perform various mathematical calculations to provide data for the analysis and development of options and solutions
- identify hazards and develop appropriate responses to control and mitigate risks in accordance with regulations and legislation
- participate in the provision of appropriate information to inform workplace processes
- apply capabilities and limitations of plant, equipment and tools
- manage work priorities
- use information effectively to improve work performance.

#### **Required knowledge:**

- types, lifecycle, characteristics of wastewater microorganisms
- operational problems caused by wastewater microorganisms
- effluent quality problems caused by wastewater microorganisms
- relevant legislation, standards and workplace policies and procedures
- principles of wastewater treatment processes
- process control strategies
- properties and mode of action of chemical additives.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to identify wastewater microorganisms and select appropriate measures to optimise the growth of beneficial microorganisms including:

- identifying a range of wastewater microorganisms, and their general characteristics and types of problems caused
- identifying effluent quality and select process control strategies to optimise the growth of beneficial microorganisms
- prepare reports outlining the optimum treatment for various microorganisms including measures to ensure validity.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water treatment organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect



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and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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.

- Wastewater microorganisms*** may include:
- fungi
  - bacteria:
    - aerobic
    - anaerobic
    - facultative
    - autotrophs
    - heterotrophs
    - filament and foam causing
    - protozoa
    - amoebae
    - ciliates
    - flagellates
    - metazoa
    - algae
    - cyanobacteria
    - helminths.
- General characteristics of microorganisms*** may include:
- evolutionary development
  - source
  - structure
  - life cycle
  - growth rates and requirements.
- Wastewater characteristics*** may include:
- presence of inhibitory substances, such as heavy metals, synthetic organics
  - nutrients - macro and micro
  - temperature
  - dissolved oxygen
  - organic loading
  - pH.
- Problems caused by microorganisms*** may include:
- bulking
  - foaming
  - inefficient nitrogen or phosphorus removal
  - lack of nitrification
  - high effluent suspended solids or biological oxygen

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- demand (BOD)
  - volatile solids reduction
  - volatile acids to alkalinity ratio
  - gas production rate - methane, carbon dioxide.
  - organisational performance standards
  - standard operating procedures
  - quality assurance
  - federal, state and local environmental and water quality legislation.
- Organisational and legislative requirements* may include:
- Manufacturers' or plant designers' specifications* may include:
- Food:Microorganism (F:M) ratio
  - Mean Cell Residues Time (MCRT)
  - Mixed Liquor Suspended Solids (MLSS)
  - phase timing in intermittent or batch processes
  - temperature
  - recirculation rates.
- Process control strategies* may include:
- Food:Microorganism (F:M) ratio
  - Mean Cell Residues Time (MCRT)
  - Mixed Liquor Suspended Solids (MLSS)
  - return and waste activated sludge rates
  - chemical and nutrient addition
  - pre-treatment to remove inhibitory or toxic substances
  - alkalinity and pH correction
  - mixed liquor recycle rates
  - phase timing in intermittent or batch processes
  - recirculation rates
  - addition of nutrients
  - temperature
  - pre-treatment to remove inhibitory or toxic substances
  - alkalinity and pH correction
  - chemical addition, such as:
    - chlorine
    - nutrients
    - aluminium and iron salts
  - flow or feed rate
  - mixing rate
  - sludge wastage rate.

## Unit Sector(s)

Not applicable.

## **Competency field**

**Competency field** Treatment

## NWP415B Coordinate and monitor surface water systems

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to coordinate and monitor the operation of surface water systems, ensuring that Surface Water Management Plan (SWMP) performance measures are met, environmental issues are addressed and a source of supply is maintained.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for ensuring that the operation of surface water systems complies with the requirements of the organisation's Surface Water Management Plan and with relevant organisational and statutory requirements. The level of responsibility may vary according to the size, scope and complexity of the surface water system.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Confirm SWMP performance measures.</b>	1.1 Identify <b><i>water flow requirements</i></b> in <b><i>surface water sources</i></b> . 1.2 Identify water quality and quantity requirements, including release rates. 1.3 Identify <b><i>environmental factors</i></b> that may impact on water flows and quality. 1.4 Identify <b><i>performance measures</i></b> for the resource and operations. 1.5 Access <b><i>historic information</i></b> and consult <b><i>stakeholders</i></b> as required.
<b>2 Monitor the performance of assets.</b>	2.1 Carry out <b><i>monitoring and testing programs</i></b> . 2.2 Correctly select, fit and use personal protective equipment. 2.3 Monitor assets to ensure performance meets specifications in the SWMP. 2.4 Schedule maintenance programs to meet current and potential problems.
<b>3 Monitor and coordinate processes.</b>	3.1 Test and monitor water usage and quality according to the SWMP. 3.2 Coordinate processes to meet SWMP requirements and targets. 3.3 Take action to optimise system performance.
<b>4 Report the outcomes of testing and monitoring.</b>	4.1 Analyse, record and report coordination and monitoring data according to organisational procedures and statutory requirements. 4.2 Identify and report current or potential problems.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation and policies
- coordinate measuring and testing activities
- consult with customers and stakeholders
- conduct site inspections
- lead work teams
- assess personal and team performance
- perform system calculations
- conduct investigations
- identify problems
- assess environmental impact
- use personal protective equipment.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- measuring and testing procedures
- investigation procedures
- surface water system
- customer expectations and requirements
- climatic and weather characteristics and impacts
- hydraulic analysis.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to coordinate and monitor the operation of surface water systems including:

- identifying water flow, quality and quantity requirements and any environmental factors that may affect these
- identifying surface water system performance measures from the SWMP
- accessing historic information
- consulting stakeholders
- conducting or supervising asset monitoring and testing programs
- scheduling asset maintenance programs
- conducting or supervising testing and monitoring of water usage and water quality
- coordinating processes to meet targets and optimise system performance
- analysing data, completing records and producing reports
- identifying and reporting current and potential problems.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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



## EVIDENCE GUIDE

separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Water flow requirements*** may include:

- usage and environment allocations
- licenses
- legislation
- enterprise policies.

***Surface water sources*** may include:

- dams
- reservoirs
- weirs
- rivers
- lakes
- creeks and streams
- wetlands
- off stream storage
- catchment areas
- storage tanks.

***Environmental factors*** may include:

- environmental flow requirements
- catchment usage and management
- weather and climate
- rainfall run-off
- chemicals
- salinity
- nutrients
- reservoir operations
- natural events.

***Performance measures*** may include:

- setting targets and objectives for quantity
- quality
- stakeholders
- future use.

***Historic information*** may include:

- hydrological information
- previous monitoring studies
- geological data
- hydro-geological data
- land use studies
- environmental management studies

## **RANGE STATEMENT**

*Stakeholders* may include:

- anecdotal information from land owners.
- water consumers
- government
- water authorities
- environmental departments
- general public
- interest groups
- industry
- extractive industry.

*Monitoring and testing programs* may include:

- resource yields
- resource status
- flow rates
- testing procedures
- testing medium
- testing frequency
- sampling locations
- testing variables
- land use changes.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP416B Coordinate and monitor water storage catchment activities

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the coordination and monitoring of activities in water storage catchments that impact on water yield and/or quality.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for ensuring that storage catchment activities comply with organisational and statutory requirements. The level of responsibility may vary according to the size, scope and complexity of the catchment area system.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Confirm the performance measures for catchment management.</b>	<p>1.1 Identify <b><i>catchment management requirements</i></b>.</p> <p>1.2 Identify <b><i>stakeholder</i></b> requirements that impact on the catchment area.</p> <p>1.3 Gather <b><i>historical catchment information</i></b> and apply as required.</p> <p>1.4 Identify water quality and quantity requirements.</p> <p>1.5 Identify <b><i>environmental factors</i></b> and <b><i>issues</i></b> that impact on the catchment area.</p>
<b>2 Monitor catchment activities.</b>	<p>2.1 Apply monitoring and <b><i>testing programs</i></b> according to organisational procedures.</p> <p>2.2 Correctly select, fit and use personal protective equipment.</p> <p>2.3 Monitor catchment area usage according to the plan.</p> <p>2.4 Identify, investigate and report breaches of usage provisions.</p>
<b>3 Report outcomes of testing and monitoring.</b>	<p>3.1 Analyse, record and report coordination and monitoring data according to organisational procedures and statutory requirements.</p> <p>3.2 Identify and investigate current and/or potential problems and report results.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation and policies
- coordinate measuring and testing activities
- conduct investigations
- assess environmental impact
- solve operational problems
- produce reports and logs
- use safety equipment and personal protective equipment
- calculate flow and capacity
- coordinate safety surveillance
- interpret plans, policies and standard operating procedures
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- identify control system faults
- identify water quality risks and prepare protection strategies.

#### **Required knowledge:**

- relevant historical records
- relevant legislation
- relevant enterprise policies
- relevant technical skills
- advanced technology
- range of appropriate measuring and testing procedures
- investigation procedures
- coordination processes
- system layout
- system processes
- environmental aspects of catchment areas
- safety procedures
- policies and standard operating procedures
- relevant utilities and service bodies
- hazardous substances handling
- communication systems
- risk management principles
- risk factors and potential hazards involved with catchment area processes equipment operation, capacity and limitations

## **REQUIRED SKILLS AND KNOWLEDGE**

- effects of weather and conditions on operation of catchment areas
- pumping and valving systems
- control systems
- pest control specifications
- customer expectations and requirements
- occupational health and safety and environmental legislation, Acts and procedures.
- catchment management issues, including:
  - feral/native animals
  - transfer of noxious weeds
  - human interaction with the catchment including litter and waste
  - perimeter inspections
  - fire management
  - mimosa
  - policing role
  - conservation management
  - remote community catchment areas.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to coordinate and monitor water storage catchment activities including:

- identifying catchment management requirements
- identifying stakeholder requirements and environmental factors that impact on water storage catchment areas
- implementing monitoring and testing programs
- monitoring usage
- investigating and reporting on breaches
- reporting on monitoring activities.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be



## EVIDENCE GUIDE

authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Catchment management requirements*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- organisational needs
- codes of practice.

***Stakeholders*** may include:

- state forestry bodies
- state parks authorities
- land care groups
- catchment management trusts and community groups
- environmental interest groups
- native title and indigenous groups
- state government
- water authorities
- users and customers, including:
  - recreationists
  - forestry
  - housing
  - farming
  - consumers of water
  - water authorities.

***Historic catchment information*** may include:

- relevant hydrological information
- previous monitoring studies
- vegetation surveys
- anecdotal information from land holders
- geological data
- hydro-geological data.

***Environmental factors that impact on the catchment area*** may include:

- flora
- fauna
- chemicals
- land degradation
- nutrients
- fire breaks
- farming practices

## RANGE STATEMENT

*Issues that impact on or relate to the catchment area* may include:

- land use.
- cultural sites
- land use
- environmental issues
- other human activity.

*The testing program* may be:

- on site
- in a specified laboratory
- and may include:
  - sampling and testing procedures
  - testing medium
  - frequency
  - sampling locations
  - testing variables.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# NWP417B Coordinate and monitor groundwater system usage

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to coordinate and monitor the use of groundwater as a source of water supply ensuring that Ground Water Management Plan (GWMP) performance measures are met, environmental issues are addressed and a source of supply is maintained.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for ensuring that groundwater system usage complies with the GWMP and that assets and processes comply with organisational and statutory requirements. The level of responsibility may vary according to the size, scope and complexity of the groundwater system.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Confirm GWMP performance measures.</b>	1.1 Identify groundwater management requirements. 1.2 Identify <b><i>stakeholder</i></b> requirements that impact on the groundwater quality, quantity and conservation. 1.3 Gather <b><i>historical groundwater information</i></b> and apply as required. 1.4 Identify water quality and quantity requirements. 1.5 Identify <b><i>environmental and development factors</i></b> that impact on groundwater.
<b>2 Monitor and coordinate processes.</b>	2.1 Conduct <b><i>monitoring and testing programs</i></b> . 2.2 Monitor groundwater usage and quality according to the GWMP. 2.3 Identify, investigate and report breaches of usage provisions and changes to quality parameters.
<b>3 Monitor performance of assets.</b>	3.1 Monitor assets to ensure performance meets specifications in plan. 3.2 Correctly select, fit and use personal protective equipment. 3.3 Schedule maintenance programs to meet current and potential problems.
<b>4 Report on groundwater system usage.</b>	4.1 Analyse, record and report coordination and monitoring data according to <b><i>organisational procedures and statutory requirements</i></b> . 4.2 Identify and investigate current and potential problems. 4.3 Report investigation results and recommendations.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation and policies
- coordinate measuring and testing activities
- conduct investigations
- assess environmental impact
- solve operational problems
- produce reports
- calculate flows
- undertake source inspections
- follow standard operating procedures
- communicate with employees and customers
- use communication equipment
- identify control system faults
- use safety equipment and personal protective equipment
- identify potential sources of contamination.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- groundwater analysis procedures
- groundwater hydraulics
- environmental legislation
- properties of stored water
- system layout
- control systems
- equipment operation
- relevant utilities and service bodies
- hazardous materials handling
- effects of weather and conditions on bulkwater assets
- principles of soil mechanics
- concrete structure, strengths and deterioration
- construction procedures
- risk management techniques
- occupational health and safety

## **REQUIRED SKILLS AND KNOWLEDGE**

- organisational and statutory requirements.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to coordinate and monitor groundwater system usage including:

- identifying groundwater management requirements, including water quality and quantity requirements
- identifying stakeholder requirements and environmental and development factors that impact on groundwater
- implementing monitoring and testing programs
- monitoring groundwater usage and quality
- investigating and reporting on breaches
- monitoring assets performance
- scheduling asset maintenance programs
- analysing and reporting asset performance data
- identifying, investigating and reporting current and potential asset problems, including recommendations for action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the



## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Stakeholder*** may include:

- water consumers
- government
- water authorities
- environmental departments
- general public
- interest groups
- industry
- extractive industry.

***Historic groundwater information*** may include:

- relevant geological data
- hydro-geological data
- hydrological information
- previous monitoring studies
- land use studies
- environment management studies.

***Environmental and development factors*** may include:

- human interaction
- adsorption
- pollutants
- nutrients
- salinity
- cultural aspects
- land use
- other human activity
- vegetation
- urban growth
- industry growth.

***Monitoring and testing programs*** may include:

- resource yield
- testing procedures
- testing medium
- frequency
- quality requirements
- geophysical work
- modelling
- surveys

## **RANGE STATEMENT**

*Organisational procedures and statutory requirements* may include:

- water quality
- other variables.
- statutory requirements, including:
- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- Australian Drinking Water guidelines.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP418B Coordinate and monitor bulkwater system operations

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to monitor and coordinate the operation of bulkwater systems and to measure and report on system performance and process quality control.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for ensuring that bulkwater system operations are coordinated and monitored to ensure compliance with organisational and statutory requirements.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Confirm performance measures in bulkwater management plan.</b>	1.1 Identify water flow, quality and quantity requirements. 1.2 Identify <b><i>surveillance</i></b> requirements. 1.3 Identify <b><i>stakeholder</i></b> requirements that impact on system operation. 1.4 Identify performance measures for the resource and operation. 1.5 Identify environmental flows that impact on water flows and quality.
<b>2 Monitor performance of assets.</b>	2.1 Correctly select, fit and use <b><i>equipment</i></b> , including personal protective equipment. 2.2 Apply <b><i>monitoring</i></b> and testing programs according to <b><i>organisational and statutory requirements</i></b> . 2.3 Monitor assets to ensure performance meets specifications in management plan. 2.4 Schedule maintenance programs to meet current and/or potential problems.
<b>3 Coordinate processes.</b>	3.1 Monitor water flows and quality according to plan. 3.2 Coordinate processes to meet plan requirements and targets. 3.3 Take action to optimise system performance.
<b>4 Report outcomes of coordination and monitoring.</b>	4.1 Analyse, record and report coordination and monitoring data according to organisational procedures and statutory requirements. 4.2 Identify and report current and/or potential problems.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports and logs
- interpret plans, charts and instructions
- interpret policies, procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- operate computerised equipment
- identify control system faults
- use safety equipment and personal protective equipment
- identify and investigate operational problems
- collect and analyse data
- use communication systems
- control system operations.

#### **Required knowledge:**

- system hydraulics
- coordination processes
- system layout
- system processes
- environmental aspects of bulkwater systems
- chemical use
- safety procedures
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- risk factors and potential hazards involved with water pressures and flows
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of supply networks
- pipes and fittings
- pumping and valving systems
- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to monitor and coordinate the operation of bulkwater systems, including:

- identifying system performance measures, stakeholder requirements and environmental factors that may influence performance
- implementing monitoring and testing programs
- scheduling maintenance
- coordinating and optimising system performance
- collecting and recording data
- producing required reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Surveillance*** may apply to:

- earthen walls
- concrete walls
- hydraulic structures
- electrical equipment
- spillways
- outlets
- pipes
- conduits
- foundations
- mechanical equipment (eg gates, valves)
- reservoir perimeter
- weirs
- tunnels
- galleries.

***Stakeholders*** may include:

- dam owners
- water authorities
- government
- water consumers
- downstream land owners
- meteorological bureau
- local government
- emergency organisations
- police
- land care and water watch groups
- industry.

***Equipment used*** may include:

- electronic monitoring and metering systems
- manual chart recording systems
- on- and off-road vehicles
- communication equipment
- personal protective equipment.

***Monitoring*** may require:

- interaction and communication with other employees, other authorities and the general public
- visual observation
- implementation of reporting procedures that may also

## RANGE STATEMENT

- Organisational and statutory requirements* may include:
- include procedures for the implementation of by-laws, organisational policies and statutory requirements.
  - environmental laws and policies
  - by-laws and organisational policies
  - Water Acts
  - Australian Drinking Water Guidelines
  - construction and occupational health and safety regulations
  - public safety and disaster plans
  - International Commission on Large Dams and Australian National Committee on Large Dams (ANCOLD) guidelines
  - state government or state committees
  - asset management plan.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

## **NWP419B Coordinate and monitor river system usage**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to monitor and coordinate the operation of river systems and measure and report on river flows, including flood plains and the river environment.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for ensuring that river system usage complies with organisational and statutory requirements.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 <b>Confirm performance measures in river system management plan.</b>	1.1 Identify water flow requirements. 1.2 Identify water quality and quantity requirements. 1.3 Identify environmental factors that impact on water flows and quality. 1.4 Identify performance measures for the resource and operations.
2 <b>Monitor performance of assets.</b>	2.1 Correctly select, fit and use <b><i>equipment</i></b> , including personal protective equipment. 2.2 Apply monitoring and testing programs. 2.3 Monitor assets to ensure performance meets specifications in the river system management plan.
3 <b>Coordinate processes.</b>	3.1 Monitor water usage and quality according to the river system management plan. 3.2 Coordinate processes to meet planned requirements and targets. 3.3 Apply <b><i>system adjustments</i></b> to ensure that system performance meets <b><i>organisational and statutory requirements</i></b> .
4 <b>Report outcomes of coordination and monitoring.</b>	4.1 Analyse, record and report coordination and monitoring data according to organisational requirements. 4.2 Identify current and/or potential problems and report according to organisational procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- solve operational problems
- produce reports and logs
- use safety equipment and personal protective equipment
- interpret plans, charts and instructions
- perform system-related calculations
- interpret policies, procedures and standards
- communicate with employees and customers
- use communication equipment
- give and receive instructions
- analyse personal and team performance
- operate computerised equipment
- identify control system faults.

#### **Required knowledge:**

- system hydraulics
- coordination processes
- system layout
- environmental aspects of river systems
- system processes
- lock out procedures for mechanical and electrical installations
- policies, procedures and legislation
- relevant utilities and service bodies
- communication systems
- risk factors and potential hazards involved with river systems
- equipment operation, capacity and limitations
- system calculations
- effects of weather and conditions on operation of river systems
- pipes and fittings
- pumping and valving systems
- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to coordinate and monitor river system usage including:

- identifying water flow, water quality and water quantity requirements
- identifying relevant environmental factors to be considered
- identifying performance measures for the resource and operations
- implementing monitoring and testing programs, including monitoring of assets, water usage and water
- coordinating processes and making system adjustments
- analysing and reporting data and reporting problems.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Equipment used*** may include:

- electronic monitoring and metering systems
- manual chart recording systems
- on- and off-road vehicles
- communication equipment
- personal protective equipment.

***System adjustments*** may include:

- regulation of flow and pressure, including the adjustment of:
  - pumping systems
  - valving systems
  - control systems.

***Organisational and statutory requirements*** may include:

- by-laws and organisational policies
- standard operating procedures
- environment protection
- relevant Australian Standards
- manufacturer's standards and specifications.
- equal employment opportunity
- occupational health and safety
- World Health Organisation and National Health and Medical Research Council (NHMRC) guidelines.

### Unit Sector(s)

Not applicable.

### Competency field

**Competency field**      Collection and distribution



# NWP420A Install, operate and maintain hydrometric instruments and equipment

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to install, operate and maintain hydrometric instruments and equipment in sound order and to organisational standards. The role requires understanding of the capacity, purpose and application of the instruments and equipment and the ability to select, install, test and maintain hydrometric instruments and equipment to provide accurate data for the client.

This unit replaces NWP341A Install and maintain hydrometric instruments and equipment

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for assistant hydrographers, field hydrologists and water operators responsible for reporting water quality, volume and flow in water systems. This unit is part of the skills set for hydrography and is suitable for entry level and working under the supervision of a senior hydrographer.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
1 Plan the installation of hydrometric instruments and equipment	<p>1.1 Analyse the purpose and suitability of <i>hydrometric instruments and equipment</i> required for the site and its conditions.</p> <p>1.2 Ensure that the manufacturers' specifications are applied.</p> <p>1.3 Confirm organisational procedures for installing the instruments and equipment and reflect these in the plan of installation task schedules.</p> <p>1.4 Prepare relevant equipment, logistical requirements, authorisations and <i>documentation</i> required for the installation.</p>
2 Install hydrometric instruments, equipment and systems	<p>2.1 Assemble, prepare and test <i>assignment instruments and equipment</i> prior to transportation to the site to ensure that they are fit for purpose.</p> <p>2.2 Install <i>assignment instruments and equipment</i> in accordance with manufacturers' specifications, <i>organisational standards and safe work practices</i>.</p> <p>2.3 Conduct installation tests in accordance with standard operating procedures to ensure the correct operation of instruments and equipment.</p> <p>2.4 Complete records and commissioning of the installation process in accordance with organisational procedures.</p>
3 Test and maintain hydrometric instruments, equipment and systems	<p>3.1 Test assignment instruments and equipment in accordance with organisational, industry standards and client requirements.</p> <p>3.2 Make and test adjustments to comply with the required tolerances.</p> <p>3.3 Report errors or deviations from the appropriate range or tolerance levels in accordance with organisational and industry standards.</p> <p>3.4 Maintain test records in accordance with organisational requirements.</p> <p>3.5 Complete <i>routine maintenance</i> in accordance with organisational requirements and maintenance schedules.</p> <p>3.6 <i>Store and protect instruments</i> and equipment in accordance with organisational and manufacturers' requirements.</p>
4 Operate hydrometric monitoring equipment	<p>4.1 Use monitoring equipment to collect data required by assignment plan and purpose.</p> <p>4.2 Make calculations and adjustments according to the requirements of the site and equipment.</p> <p>4.3 Check the accuracy and reliability of readings and confirm or adjust calibrations.</p>
5 Report processes and outcomes	<p>5.1 Compile reports and data according to organisational requirements and monitoring plan.</p>

**ELEMENT**

**PERFORMANCE CRITERIA**

5.2 Identify potential and current problems proactively and take corrective action or report to relevant agents.

5.3 Identify indicators of urgency and high risk for priority response.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- interpret and apply technical documentation to the installation and maintenance of instruments and equipment
- apply mechanical skills to the effective installation and maintenance of instruments and equipment
- apply electrical/electronic skills to the effective installation and maintenance of instruments and equipment
- apply computer systems and system analysis equipment and tools to conduct in situ calibration and commissioning of monitoring equipment and systems
- use required work practices to minimise environmental impact of the installation process
- use safety equipment and personal protective equipment appropriately
- use hand and power tools and other relevant equipment effectively and safely
- identify and respond to potential or actual operational problems
- conduct inspections
- produce reports
- collect and analyse data
- read and interpret plans, specifications, maps and job instructions
- communicate with employees and customers using clear and direct communication
- use communication systems
- give and receive instructions
- apply skills specific to the industry and for working safely in remote locations including:
  - remote area survival
  - water safety
  - high voltage work environment.

#### Required knowledge:

- mathematical and scientific principles appropriate to the work role
- operating parameters, processes and capacity limitations of hydrometric instruments and equipment
- electrical/electronic systems operating principles
- risk factors and potential hazards involved with installing and monitoring instruments and equipment
- effects of weather and conditions on operation of hydrometric instruments and equipment
- computer based instrument/system analysis software and packages
- occupational health and safety procedures
- policies and standard operating procedures
- relevant utilities and service bodies

## **REQUIRED SKILLS AND KNOWLEDGE**

- communication systems
- standards relevant to the installation tasks including:
- AS 3778 for water measurement installations
- World Meteorological Organisation / Bureau of Meteorology guidelines for siting of meteorological sensors and systems
- application of best practice methodology where standards not applicable or available.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate, in accordance with standard organisational and industry procedures, the ability to install, operate and maintain hydrometric instruments and equipment in sound order and to organisational standards including:

- interpreting and applying complex technical information and applications related to the installation and maintenance of a range of hydrometric instruments and equipment
- conducting accurate and reliable tests of a range of hydrometric instruments and equipment and make adjustments to maintain accuracy
- installing and maintaining a range of hydrometric instruments and equipment in a range of sites and conditions and under conditions of extreme weather and high risk
- analysing risks in a range of locations and conditions and working safely in routine and extreme conditions
- identifying, reporting and solving potential and current problems, and taking immediate action to address high risk conditions.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

## EVIDENCE GUIDE

Validity and sufficiency of evidence require 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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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.

- Hydrometric instruments and equipment*** may include:
- sensors
  - transducers
  - samplers
  - data loggers
  - telemetry
  - power supplies
  - float wells
  - weirs and flumes
  - gauge boards.
- Documentation*** may include:
- job specifications and work plans
  - maps and plans
  - survey data
  - notice of entry procedures
  - quarantine procedures
  - mines regulations
  - organisational procedures and manuals
  - instrument and systems manufacturers' manuals
  - standards relevant to the installation tasks including:
  - AS 3778 for water measurement installations
  - World Meteorological Organisation / Bureau of Meteorology guidelines for siting of meteorological sensors and systems
  - documentation of best practice methodology where standards not applicable or available
- Assignment instruments and equipment*** may include:
- personal protective equipment
  - hand and power tools
  - portable power supplies
  - computer equipment
  - pumping equipment
  - test equipment
  - communications equipment
  - signage
  - 4WD vehicles

## RANGE STATEMENT

*Organisational standards and safe work practices* may include reference to:

- surveying equipment:
- pegs
- staffs
- levels
- GPS
- electronic data management systems
- water velocity measurement devices:
- mechanical current meters
- acoustic-Doppler current meters and profilers.
- by-laws and organisational policies
- standard operating procedures
- environment protection standards and requirements
- occupational health and safety standards and requirements, including use of personal protective equipment
- safe handling of hazardous substances
- appropriate use of road and worksite signage
- survey of sections
- procedures for discharge measurement in open channels using mechanical current meters:
- waded gaugings
- flood gaugings by cableways
- travellers or boats
- procedures for discharge measurement in open channels using:
- acoustic-Doppler current meters or profilers waded gaugings
- flood gaugings by staffed cableway
- unstaffed traveller waybridge or boat.
- using appropriate cleaning agents and materials to remove surface dirt and contaminants
- applying lubricants in accordance with work instructions and manufacturers' specifications
- performing annual or other routine and scheduled inspections of physical surroundings of the monitoring installation to identify external impacts (adverse or otherwise) on data quality and monitoring system performance
- performing preventative maintenance management systems
- maintaining instrument/system management databases and record systems to assist with planning outages or

*Routine maintenance* may include:

## RANGE STATEMENT

- alternative monitoring systems
- replacing components in accordance with work instructions and manufacturers' specifications
  - conducting minor repairs
  - conducting calibrations
  - conducting appropriate vegetation management in gauging sections, around meteorological monitoring sites to maintain constant environmental factors affecting the monitoring site.
  - stowing instruments and equipment securely and in appropriate containers for storage and transport
  - protecting instruments and equipment, as appropriate, from extremes of:
    - heat
    - moisture
    - electromagnetic radiation
    - shock
    - vibration.
- Store and protect instruments* by a range of processes including:

## Unit Sector(s)

Not applicable.

## Competency field

Competency field     Hydrography

# NWP421A Collect, measure and process hydrometric stream discharge gauging

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit describes the competencies required to collect data using a range of discharge measuring methods and equipment, measure and calculate readings and interpret and report data for a range of clients and stakeholders.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for assistant hydrographers, field hydrologists and water operators responsible for reporting water quality, volume and flow in water systems. This unit is part of the skills set for hydrography and is suitable for entry level and working under the supervision of a senior hydrographer.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Identify flow gauging.</b>	<p>1.1 Identify stream discharge and <i>factors affecting accuracy</i>.</p> <p>1.2 Identify the purposes of gauging and <i>gauging methodologies</i>.</p> <p>1.3 Identify the <i>area velocity methods</i> for calculating discharge.</p> <p>1.4 Identify <i>hazards</i> and hazard management principles according to <i>occupational health and safety requirements</i>.</p>
<b>2 Collect depth and velocity data.</b>	<p>2.1 Take measurements during gauging following occupational health and safety procedures.</p> <p>2.2 Select verticals for measurement of velocity.</p> <p>2.3 Select suitable <i>gauging equipment</i> according to the conditions of the location, assignment and client requirements and <i>gauging site conditions</i>.</p> <p>2.4 Prepare the equipment and gauging site.</p> <p>2.5 Apply a range of suitable and <i>alternative methods</i> for obtaining the mean velocity in a vertical.</p> <p>2.6 Apply the mid section and mean section methods.</p> <p>2.7 Position the current meter according to guidelines.</p> <p>2.8 Select the appropriate discharge measurement method.</p> <p>2.9 Calculate the depth settings and point velocity using <i>required mathematical techniques</i>.</p>
<b>3 Calculate discharge.</b>	<p>3.1 Apply corrections for oblique flows and drift angles.</p> <p>3.2 Calculate the mean velocity for each vertical.</p> <p>3.3 Calculate the area and discharge corresponding to each sub-section.</p> <p>3.4 Calculate the discharge using the mid section and mean section method.</p> <p>3.5 Calculate and record the mean stage and rate of change.</p> <p>3.6 Calculate the channel storage and time of travel effects.</p>
<b>4 Report discharge readings.</b>	<p>4.1 Compare the discharge measurements with the current rating.</p> <p>4.2 Record the <i>percentage deviation</i> from the rating.</p> <p>4.3 Grade and record the gauging quality with interpretation comments.</p> <p>4.4 Gather <i>supporting information</i> from the site and document accurately according to <i>organisation requirements</i>.</p> <p>4.5 Enter gauging into ratings database according to organisation requirements.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- use area velocity method
- assess hazards and apply relevant precautions and action
- estimate and explain the anticipated vertical distribution
- make calculations on depth and velocity
- maintain the integrity of measurements
- use a range of suitable techniques to accurately determine mean stage in rapidly changing situations
- adjust measurements correctly
- plot discharge measurements on organisation's preferred scale
- use formulae for determining the percentage deviation
- use computing system and software to transfer calculated flows to office database
- assemble and test metering equipment
- check operation of equipment
- check gauging section
- set tag lines
- prepare gauging section.
- 

#### Required knowledge:

- principles of discharge measurement
- methods for calculating mean velocity in a vertical
- methods for determining the cross sectional area at a site
- alternative methods of discharge measurement
- the organisation's operating procedures for hydrometric stream discharge measurement
- the timing, location and number of verticals for stage readings
- the characteristics of a suitable section for wading and boat gauging and how to make modifications
- requirements for surface, single and multipoint floats
- basic mathematical principles for area and velocity measurements
- correction procedures for horizontal angles
- correction procedures for suspension measurements
- techniques for monitoring stage changes during discharge measurement
- weighted mean stage calculations
- discharge and mean stage adjustment
- technical components in calculating discharge
- factors impacting on discharge measurements and the quality of the discharge

## **REQUIRED SKILLS AND KNOWLEDGE**

- formulae to adjust gaugings
- potential impacts of modifications of site, method or equipment on discharge accuracy
- confidence limits
- function of each field on the measurement forms
- the organisation's registration procedures
- calibration procedures
- OHS procedures, safe operation of equipment and identification of potential hazards.



## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to collect data using a range of discharge measuring methods and equipment including:

- measuring and calculating readings
- interpreting and reporting data for a range of clients and stakeholders
- gathering data related to client requirements
- interpreting complex documentation and applying it to the specification of hydrometric data collection and reporting procedures
- sampling accurately and consistently with client requirements
- analysing and verifying data using standard procedures, software and databases
- preparing clear and accurate reports
- storing and archiving data
- identifying, reporting and (within scope of job function) solving potential or current problems.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in the workplace
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when indicated by gaps in competency.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence require that:

- competency will need to be demonstrated over a period of

## EVIDENCE GUIDE

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

- Factors affecting accuracy*** may include:
- laminar flow
  - turbulent flow
  - critical states
  - sensitivity
  - pulsing
  - backwater.
- Gauging methodologies*** may include:
- wading
  - travellerway
  - cableway
  - boat
  - bridge
  - portable flume
  - float
  - acoustic profiler.
- Area velocity method*** may include:
- AS 3778 - Measurement of Water Flow in Open Channels:
    - velocity-area methods
    - measurement by current-meters and floats
    - operating procedures for discharge measuring equipment and calibration.
- Hazards*** may include:
- boat handling
  - bed stability
  - winch operation
  - tag line setting
  - traffic management
  - working at heights
  - manual handling
  - personal protective equipment (PPE).
- Occupational health and safety requirements*** will include:
- hazard recognition:
    - working on and near water
    - safe working depth
    - bank and bed stability
    - rising stage

## RANGE STATEMENT

- snags
- floating debris
- water temperature
- water contamination
- weather exposure
- rescue procedures
- PPE requirements:
- onsite communication and procedures for working remotely
- equipment
- storage
- assembly
- cleaning
- handling, transport
- personal welfare and safety:
- medical constraints
- CPR
- First Aid
- water survival and rescue
- self rescue
- bush survival
- 4WD driving and recovery
- defensive driving
- boat handling
- traffic management authority regulations.
- winch
- travellerway
- cableway
- boat
- vehicle
- trolley mount
- mechanical & acoustic meters
- oil change
- calibration.
- hazards
- obstructions
- climatic
- sufficient depth
- sufficient velocity
- flow angle

*Gauging equipment* may include:

*Gauging site conditions* may include:

## RANGE STATEMENT

- laminar flow
  - bank condition
  - anabranches and multiple channels
  - pre-season maintenance.
- Alternative methods* may include:
- volumetric
  - flumes
  - slope/area techniques
  - dilution.
- Required mathematical techniques* will include:
- area
  - volume
  - mean
  - suitable formulae
  - trigonometry.
- Percentage deviation* will be determined by:
- checking:
  - calculations
  - equipment
  - control
  - recording equipment
  - repeat measurement.
- Supporting information* will include:
- gauging section location and access maps
  - photographic records
  - site preparation undertaken
  - comments on issues encountered.
- Organisational requirements* will include:
- data management and reporting
  - worksite procedures
  - occupational health and safety procedures
  - operating procedures.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Hydrography

# NWP425B Coordinate and monitor the operation of irrigation delivery systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to coordinate and monitor irrigation delivery systems to ensure system maintenance and performance standards and customer liaison.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for ensuring that the operation of irrigation systems complies with organisational and statutory requirements. The level of responsibility will vary according to the size and complexity of the irrigation system.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 <b>Confirm performance measures in irrigation system's management plan.</b>	1.1 Identify customer requirements for irrigated culture. 1.2 Identify <b><i>environmental factors</i></b> that impact on the irrigation system. 1.3 Consult <b><i>historic system information</i></b> and <b><i>stakeholders</i></b> as appropriate 1.4 Confirm performance requirements for an <b><i>irrigation system management plan</i></b> .
2 <b>Monitor and coordinate processes and resource targets.</b>	2.1 Correctly select, fit and use <b><i>equipment</i></b> , including personal protective equipment. 2.2 Apply <b><i>monitoring and testing programs</i></b> and identify, investigate and report any deviations from water quantity, quality, release or flow. 2.3 Evaluate the timeliness, volume and flow rates of water deliveries and identify, investigate and report deviations from agreed service levels. 2.4 Evaluate maintenance budgets, activity programs and output target measures and identify, investigate and report deviations from targets. 2.5 Identify and record links between operational problems and maintenance activities.
3 <b>Report outcomes of coordination and monitoring.</b>	3.1 Analyse, record and report coordination and monitoring data according to <b><i>organisational procedures and statutory requirements</i></b> . 3.2 Identify and report current and potential problems according to organisational procedures. 3.3 Make recommendations for improvements in system performance and/or customer service.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation and policies
- coordinate measuring and testing activities
- conduct investigations
- assess environmental impact
- uses safety equipment and personal protective equipment
- communicate with customers and other employees
- operate irrigation and/or domestic stock supply system
- check channel flow
- identify control system faults.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- operations and maintenance policies and procedures
- occupational health and safety and environmental legislation, Acts and procedures
- impact of the principles of hydraulics on the operation of flows
- coordination processes
- principles of scheduling
- system layout
- system operations
- policies and standard operating procedures
- communication systems
- lock out procedures for mechanical and electrical installations
- environmental aspects of irrigation and/or stock and domestic supply system asset infrastructure
- safety procedures
- environment, landscape and ground structure of work area
- risk factors and potential hazards of irrigation and/or domestic and stock supply systems
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of site plant
- water flow calculations
- flow measurement procedures
- gravity systems



## **REQUIRED SKILLS AND KNOWLEDGE**

- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to coordinate and monitor the operation of irrigation systems including:

- identifying customer requirements for irrigated culture and environmental factors that impact on the irrigation system
- consulting historic system information and stakeholders as appropriate
- confirming performance requirements for an irrigation system management plan
- implementing monitoring and testing programs and investigating and reporting deviations from planned parameters
- evaluating performance of water deliveries and investigating and reporting deviations from agreed service levels
- evaluating performance targets such as maintenance budgets, activity programs and output target and investigating and reporting deviations
- analysing and reporting data
- identifying and reporting problems
- making recommendations for system performance or customer service improvements.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Environmental factors*** may include:
- environmental flows
  - chemicals
  - nutrients
  - salinity
  - downstream requirements.
- Historic system information*** may include:
- previous studies
  - impact of weather
  - relevant hydrometric information
  - previous system deliveries
  - previous flow rates
  - operational procedures.
- Stakeholders*** may include:
- customers
  - government
  - farmer and grower associations
  - downstream land holders
  - other water authorities
  - employees
  - customer representative committees
  - land care or similar active groups
  - local communities.
- Irrigation system management plan*** may include:
- service levels
  - capital investment
  - maintenance levels.
- Equipment*** may include:
- electronic monitoring and metering systems
  - manual chart recording systems
  - on- and off-road vehicles
  - communication equipment
  - personal protective equipment.
- Monitoring and testing programs*** may include:
- timeliness of deliveries
  - flow
  - input and output quality
  - testing procedures
  - frequency

## **RANGE STATEMENT**

*Organisational and statutory requirements* may include:

- sampling locations
- budgets
- physical achievement targets
- operational procedures
- number of complaints.
- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws or planning instruments
- board or authority by-laws.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# **NWP427B Coordinate and monitor the operation of drainage systems**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to coordinate and monitor drainage systems to ensure compliance with the drainage systems management plan, including system performance, maintenance planning and customer liaison.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for ensuring that the operation of drainage systems complies with organisational and statutory requirements.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Confirm performance measures in the drainage system management plan.</b>	1.1 Confirm data gathering requirements specified in the <i>drainage system</i> management plan. 1.2 Identify, analyse and address issues that impact on drainage systems. 1.3 Identify, analyse and address <i>stakeholder</i> requirements that impact on the drainage system. 1.4 Identify, analyse and address environmental factors that impact on the drainage system. 1.5 Access <i>historic system information</i> and apply as required.
<b>2 Monitor and coordinate processes and resource targets.</b>	2.1 Correctly select, fit and use equipment, including personal protective equipment. 2.2 Conduct system performance <i>monitoring and testing</i> according to the drainage management plan. 2.3 Analyse test results and report results according to <i>organisational procedures and statutory requirements</i> . 2.4 Identify current and potential problems, conduct investigations and report results and recommendations according to organisational requirements. 2.5 Identify breaches of the drainage management plan, conduct investigations and report results and recommendations according to organisational requirements. 2.6 Evaluate maintenance budgets, activity programs and output target measures and Identify, analyse and address any deviations from targets. 2.7 Identify and record links between operational problems and maintenance activities.
<b>3 Report outcomes of coordination and monitoring.</b>	3.1 Analyse, record and report coordination and monitoring data according to organisational procedures. 3.2 Identify and report current and potential problems according to organisational procedures. 3.3 Make recommendations to improve system performance and/or customer service standards.



## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- interpret and apply legislation and enterprise policies
- coordinate measuring and testing activities
- conduct investigations
- interpret and apply environmental legislation
- apply consultation and communication skills
- assess environmental impact
- solve operational problems
- produce reports
- use safety equipment and personal protective equipment
- interpret plans, topographic drawings, charts, service diagrams, service search diagrams and instructions
- communicate with employees and customers
- use communication equipment
- identify control system faults.

#### Required knowledge:

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- enterprise financial systems and key performance indicators
- occupational health and safety legislation
- inspection of drainage systems
- coordination processes
- system layout
- system processes
- environmental aspects of drainage systems
- lock out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- risk factors and potential hazards involved in drainage systems
- equipment operation, capacity and limitations
- effects of weather and conditions on operation of drainage systems
- pipes and fittings
- pumping and valving systems

## **REQUIRED SKILLS AND KNOWLEDGE**

- gravity systems
- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to coordinate and monitor the operation of drainage systems including:

- interpreting the drainage system management plan and confirming data to be gathered
- identifying, analysing and addressing issues that impact on drainage systems, such as stakeholder requirements and environmental factors
- accessing historic system information
- conducting system performance monitoring and testing
- analysing and reporting test results
- investigating system faults and breaches of the drainage management plan and reporting results and recommendations
- monitoring budgets, programs and targets, evaluating data and investigating and reporting on deviations from the drainage system management plan
- submitting recommendations to improve system performance and/or customer service standards.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Drainage system*** may include:
- collection
  - transport
  - treatment
  - disposal
  - pipe and pumping systems
  - open drains and natural water courses
  - gross pollution traps
  - wetland treatment systems
  - stormwater outfalls
  - surface water run-off (eg roads, pavements, roofs, parks)
  - stormwater flow attenuation structures.
- Stakeholder*** may include:
- conservation groups
  - land care groups
  - general community
  - farming groups and individuals
  - mining groups and companies
  - catchment users
  - customers
  - government (all levels)
  - quasi government organisations.
- Historic system information*** may include:
- previous studies
  - impact of weather
  - relevant hydrometrical information
  - system models.
- Monitoring and testing*** may include:
- physical analysis of water, for example:
    - pH
    - conductivity
    - colour
    - turbidity
  - chemical analysis of water, for example:
    - chlorine
    - alkalinity
    - biochemical

## RANGE STATEMENT

- oxygen demand
- heavy metals
- iron
- manganese
- microbiological analyses, for example:
- coliforms
- plate counts
- algae identification and counts
- physical measures, for example:
- power
- chemicals
- water flows
- sludge volumes
- mechanical testing, for example:
- vibration
- noise
- temperature
- fauna and flora surveys
- stakeholder surveys.
- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- relevant land care group agreements
- relevant government and quasi government authorities' rules (eg Great Barrier Reef Marine Park Authority, Environment Protection Authority).

*Organisational procedures and statutory requirements* may include:

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# **NWP428B Coordinate and monitor the operation of wastewater collection systems**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to coordinate and monitor wastewater collection networks to ensure system performance, planning and maintenance conforms to targets outlined in the wastewater system management plan.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for ensuring that the operation of wastewater collection systems complies with organisational and statutory requirements. The level of responsibility may vary according to the size and complexity of the system.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Confirm performance measures in the wastewater collection system management plan.</b>	1.1 Confirm data gathering requirements specified in the <i>wastewater collection system</i> management plan. 1.2 Identify, analyse and address issues that impact on the collection and transport of wastewater. 1.3 Identify, analyse and address environmental and community factors that impact on the wastewater collection system. 1.4 Identify, analyse and address <i>stakeholder</i> requirements that impact on the wastewater collection system. 1.5 Access <i>historic system information</i> and apply as required.
<b>2 Monitor and coordinate processes and resource targets.</b>	2.1 Correctly select, fit and use equipment, including personal protective equipment. 2.2 Conduct system performance <i>monitoring and testing</i> according to the wastewater system management plan. 2.3 Analyse test results and report according to <i>organisational and statutory requirements</i> . 2.4 Identify current and potential problems, conduct investigations and report results and recommendations according to organisational requirements. 2.5 Identify breaches of the wastewater management plan, conduct investigations and report results and recommendations according to organisational requirements. 2.6 Evaluate maintenance budgets, activity programs and output target measures and identify, investigate and report any deviations from targets. 2.7 Identify and record links between operational problems and maintenance activities.
<b>3 Report outcomes of coordination and monitoring.</b>	3.1 Analyse, record and report coordination and monitoring data according to organisational requirements. 3.2 Identify and report current and/or potential problems according to organisational procedures. 3.3 Make recommendations to improve system performance and customer service standards.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation, standards and policies
- coordinate measuring and testing activities
- conduct investigations
- assess environmental impact
- solve problems
- identify and rectify operational problems
- control system operations and processes
- produce reports
- use safety equipment and personal protective equipment
- interpret plans, service diagrams, charts and instructions
- communicate with employees and customers
- use communication equipment
- calculate water flows
- identify control system faults.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- environmental legislation
- occupational health and safety legislation
- environmental aspects of wastewater collection and/or transfer systems
- system hydraulics
- managing processes
- system layout
- system processes
- systems operation
- safety procedures
- lock out procedures for mechanical and electrical installations
- relevant utilities and service bodies
- communication systems
- environment, landscape and ground structure of work area
- risk factors and potential hazards involved with water pressures and flows
- equipment operation, capacity and limitations

## **REQUIRED SKILLS AND KNOWLEDGE**

- effects of weather and conditions on the operation of supply infrastructure
- pipes and fittings
- pumping and valving systems
- service reservoirs
- gravity systems
- control systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to coordinate and monitor the operation of wastewater collection systems including:

- interpreting the wastewater collection system management plan and confirming data to be gathered
- identifying, analysing and addressing issues that impact on drainage systems, such as stakeholder requirements and environmental factors
- accessing historic system information
- conducting system performance monitoring and testing
- analysing and reporting test results
- investigating system faults and breaches of the wastewater collection system management plan and reporting results and recommendations
- monitoring budgets, programs and targets, evaluating data and investigating and reporting on deviations from the wastewater collection system management plan
- submitting recommendations to improve system performance and/or customer service standards.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

number of performances assessed at different points in time and separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Wastewater collection system*** may include:

- gravity pipe systems
- pressure pipe systems
- pump stations and pumping systems
- odour control systems
- gully traps, manholes and valve pits
- overflow storage and treatment systems
- stormwater infiltration control systems
- trade waste and domestic connections/drains.

***Stakeholder*** may include:

- system users, including:
- wastewater generators
- wastewater processors
- conservation groups
- community action groups
- general community
- industry groups and companies
- catchment users
- all levels of government
- quasi government organisations
- treatment plant operator enterprise
- chemical suppliers
- consultants
- equipment suppliers.

***Historic system information*** may include:

- previous studies
- impact of weather
- relevant hydrometrical information
- system models.

***Monitoring and testing*** may include:

- physical analysis of water, for example:
- pH
- conductivity
- colour
- turbidity
- chemical analysis of water, for example:
- chlorine

## RANGE STATEMENT

- alkalinity
- chemical oxygen demand
- heavy metals
- sulphides
- microbiological analyses, for example:
- coliforms
- plate counts
- physical measures, for example:
- power
- chemicals
- water flows
- sludge volumes
- mechanical testing, for example:
- vibration
- noise
- temperature
- fauna and flora surveys
- gas detection and testing
- odour testing
- stakeholder surveys.
- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- trade waste policies
- relevant government and quasi government authorities' rules, for example:
- Great Barrier Reef Marine Park Authority
- Environment Protection Authority.

*Organisational and statutory requirements* may include:

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# **NWP429B Coordinate, implement and report on trade waste monitoring procedures**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to coordinate, implement and report on monitoring programs for trade waste treatment and disposal in retail commercial and light industrial organisations; and to implement the monitoring of complex trade waste systems in large organisations.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for coordinating and conducting monitoring and testing of trade waste treatment and disposal according to organisational and statutory requirements. The level of responsibility may vary according to the size and scope of the trade waste system.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Coordinate the monitoring and testing program.</b>	<p>1.1 Apply <b><i>monitoring and testing programs</i></b> and procedures for <b><i>trade waste</i></b> according to the objectives of <b><i>trade waste policies and management plans</i></b> and organisational and statutory requirements.</p> <p>1.2 Analyse testing results where appropriate and report according to legislative and enterprise requirements.</p> <p>1.3 Identify and investigate issues and inconsistencies and consult <b><i>stakeholders</i></b>.</p> <p>1.4 Report investigation results and recommendations according to organisational requirements.</p>
<b>2 Monitor treatment and disposal.</b>	<p>2.1 Monitor trade waste <b><i>treatment and disposal</i></b> according to the trade waste management policies and plans and organisational requirements.</p> <p>2.2 Identify and investigate breaches of the trade waste discharge provisions and approvals and report results and/or recommendations according to <b><i>organisational requirements</i></b>.</p>
<b>3 Maintain trade waste records.</b>	<p>3.1 Accurately and legibly complete trade waste management records for the work area and store according to organisational and statutory requirements.</p> <p>3.2 Review trade waste records according to organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- use appropriate wastewater sampling and preservation techniques for onsite and laboratory testing
- interpret and apply legislation and policies applicable to trade waste
- develop monitoring plans and coordinate measuring, testing and sampling activities
- interpret and evaluate sample analysis data
- assess risks and hazards associated with sampling activities
- monitor process inputs and outputs
- plan and conduct investigations
- assess environmental impact using ISO 14001 where appropriate
- assess waste treatment methods, processes, plant and equipment
- negotiate and communicate
- use appropriate personal protective equipment for protection against physical, chemical and biological hazards.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies for trade waste management
- water quality parameters of significance to the wastewater system
- personal protection and safety precautions for wastewater sampling, including the requirements for relevant inoculations such as:
  - Q Fever
  - Hepatitis A and B
  - Polio
  - Tetanus
  - Diphtheria
- standard industrial waste treatment methods, processes and procedures for retail commercial and light industrial organisations
- basic hydraulics, chemistry and/or equivalent science
- investigation procedures
- range of appropriate measuring, testing and sampling procedures
- customer expectations and requirements
- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to coordinate and implement trade waste monitoring plans, including:

- implementing monitoring and testing programs
- analysing test results
- investigating problems on-site
- monitoring treatment and disposal provisions on-site
- recording and reporting data.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency

## EVIDENCE GUIDE

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Monitoring and testing programs*** may include:

- inspections of trade waste sites, processes, treatment methods and equipment
- maintenance schedules and reporting
- sampling and testing locations, techniques and frequencies.

***Trade waste*** may include:

- the liquid waste generated by any:
  - industry
  - business
  - manufacturing process
  - community/public facilities
  - commercial activities
- trade waste does not include domestic wastewater.

***Trade waste policies and management plans*** may include:

- industrial waste generation, handling, treatment and disposal guides
- enterprise policies, procedures and administrative framework procedures
- information on applicable trade waste laws or other requirements
- complaint records
- training records
- process information
- process operational logbooks
- inspection, maintenance and calibration records
- relevant contractor and supplier information
- incident reports
- information on emergency preparedness and response
- records of significant trade waste impacts
- audit results
- management reviews
- trade waste charging policy
- industrial trade waste generators' register
- environmental factors, including:
  - disposal options
  - sensitivity of the receiving environment

## RANGE STATEMENT

- persistency and toxicity of the substances
  - hydraulic loads
  - temperature
  - environmental management plan
  - effluent improvement plan
  - receiving treatment plant type and capacity.
- Stakeholders* may include:
- the enterprise
  - all levels of government
  - industry (eg extractive, manufacturing)
  - community action groups
  - conservation groups
  - lobby groups
  - land care groups.
- Treatment and disposal* may include:
- on-site storage and disposal and/or treatment
  - off-site disposal
  - discharge to the local authority sewerage system
  - specifying and controlling discharge rates
  - recycle and reuse options
  - on-site pre-treatment.
- Organisational requirements* may include:
- compliance with relevant legislation, for example:
  - the Environmental Protection Act 1994
  - Environment Protection and Biodiversity Conservation Act 1999
  - Waste Minimisation and Management Act 1995
  - state water management act
  - state or territory environmental and other legislation
  - local by-laws
  - compliance with International Standards, for example:
  - ISO 14000 standards
  - Australia/New Zealand Standards, for example:
  - National Plumbing and Drainage Code AS/NZS 3500
  - relevant industry codes of practice for the management of trade waste, for example:
  - industry Code of Practice for the Photographic Industry (PURE)
  - National Health and Medical Research Council's (NHMRC) National guidelines for waste management in the health care industry, 1999
  - state plumbing and drainage code of practice
  - requirements of regulatory authorities, such as:
  - Water Authorities

## **RANGE STATEMENT**

- WorkCover
- EPA
- Health Department
- local councils.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Trade waste

## **NWP430A Evaluate, implement and monitor standard low risk trade waste discharge approvals**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to assess and process applications for standard low risk trade waste discharges from retail commercial and light industrial organisations, monitor compliance with the trade waste approval issued and renew, amend, suspend or revoke trade waste discharge approvals as appropriate.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for trade waste officers or inspectors with a specific responsibility for managing applications and approvals for standard low-risk liquid trade waste discharges to wastewater collection systems from small commercial and light industrial organisations.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Advise customers on standard trade waste approval procedures.</b>	<p>1.1 Comprehensively answer <i>customer</i> queries regarding applications for <i>trade waste</i> approval with reference to <i>organisational and statutory requirements</i>.</p> <p>1.2 Comprehensively answer customer queries regarding the procedures involved in processing and approving trade waste applications with reference to organisational requirements.</p> <p>1.3 Comprehensively answer customer queries regarding the procedures involved in monitoring and renewing trade waste applications with reference to organisational requirements.</p>
<b>2 Evaluate trade waste discharges for new types of industries and/or new types of industry processes.</b>	<p>2.1 Identify significant pollutants generated by new types of industries or processes.</p> <p>2.2 Identify and apply information about known impacts, risk assessments and control procedures.</p> <p>2.3 Identify trade waste management processes and workplace procedures for new types of industries or processes.</p> <p>2.4 Develop and check contingency plans for new types of industries or processes.</p> <p>2.5 Prepare trade waste management policies and plans for new types of industries and processes.</p>
<b>3 Process applications for trade waste discharge approvals.</b>	<p>3.1 Assess standard low risk trade waste applications to establish that all necessary <i>documentation</i> has been provided.</p> <p>3.2 Assess standard trade waste applications against concentration, mass and flow limits, discharges of prohibited substances and <i>local sewerage issues</i> and consider environmental issues.</p> <p>3.3 Assess proposed pre-treatment and monitoring systems for suitability.</p> <p>3.4 Schedule and conduct onsite inspections as required.</p>
<b>4 Implement approved trade waste discharge applications.</b>	<p>4.1 Calculate estimates of relevant charges and discuss with the applicant as appropriate, according to established charging policies and formulae.</p> <p>4.2 Determine <i>monitoring activities and schedules</i> and discuss with the applicant.</p> <p>4.3 Create and maintain database records, including charging parameters and monitoring schedule.</p> <p>4.4 Monitor construction activities where applicable to ensure compliance with approvals.</p>
<b>5 Monitor customers' trade waste treatment and disposal and</b>	<p>5.1 Conduct routine monitoring of the compliance of customers' trade waste treatment and discharge according to the trade waste approval and organisational requirements.</p> <p>5.2 Establish processes to identify and report non-compliances with</p>

**ELEMENT**

**PERFORMANCE CRITERIA**

**review trade  
waste approval.**

trade waste approvals according to organisational requirements.  
5.3 Identify and apply enforcement measures and processes to  
manage identified non-compliances.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- interpret and review hydraulic and site plans
- identify and evaluate trade waste-producing processes
- evaluate process inputs and outputs
- use flow measuring or flow assessment techniques
- use appropriate wastewater sampling and preservation techniques for onsite and laboratory testing
- interpret and evaluate sample analysis data
- interpret and apply legislation and policies applicable to trade waste
- develop monitoring plans and coordinate measuring, testing and sampling activities
- plan and conduct investigations
- assess environmental impact using ISO 14001 where appropriate
- assess waste treatment methods, processes, plant and equipment
- negotiate and communicate
- use appropriate personal protective equipment for protection against physical, chemical and biological hazards

#### Required knowledge:

- relevant legislation
- relevant enterprise policies for trade waste management
- water quality parameters of significance to the wastewater system
- personal protection and safety precautions for wastewater sampling, including the requirements for relevant inoculations such as:
  - Q Fever
  - Hepatitis A and B
  - Polio
  - Tetanus
  - Diphtheria
- standard industrial waste treatment methods and processes for retail commercial and light industrial organisations
- basic hydraulics, chemistry and/or equivalent science
- basic knowledge of wastewater collection, treatment and disposal systems
- investigation procedures
- range of appropriate measuring, testing and sampling procedures
- customer expectations and requirements
- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to evaluate, implement and monitor standards trade waste approvals, including:

- advising customers of the trade waste management policies and procedures in operation
- advising customers of requirements for obtaining and complying with trade waste discharge approvals
- assessing and evaluating applications for standard trade waste treatment and disposal
- implementing charging and monitoring procedures
- completing records and reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Customer*** may include:

- new or existing retail commercial organisations
- new or existing community and public organisations
- new or existing light industrial organisations.

***Trade waste*** may include:

- the liquid waste generated by any:
  - industry
  - business
  - manufacturing process
  - community/public facilities
  - commercial activities
- trade waste does not include domestic wastewater.

***Organisational and statutory requirements*** may include:

- relevant legislation, for example:
  - commonwealth environmental legislation
  - state water legislation
  - state environmental and other legislation
  - local by-laws
- International Standards, for example:
  - ISO 14000 standards
  - Australia/New Zealand Standards, for example:
    - National Plumbing and Drainage Code AS/NZS 3500
  - relevant industry codes of practice for the management of trade waste, for example:
    - industry Code of Practice for the Photographic Industry (PURE)
    - National Health and Medical Research Council's (NHMRC) National guidelines for waste management in the health care industry, 1999
    - state plumbing and drainage code of practice
- requirements of regulatory authorities, such as:
  - Water Authorities
  - WorkCover
  - EPA
  - Health Department
  - local councils.

## **RANGE STATEMENT**

- Documentation*** may include:
- identification and process information for all waste producing processes
  - site hydraulic plan
  - site plan
  - specification of the proposed pre-treatment equipment
  - stormwater drainage plan.
- Local sewerage issues*** may include:
- impact of proposed wastewater discharge on the environment including odour management
  - effluent management, re-use and disposal
  - biosolids management, re-use and disposal
  - impact on health and safety of water utility employees
  - impact on the sewerage infrastructure and sewage treatment processes
- Monitoring activities and schedules*** may include:
- inspections of trade waste sites, processes and treatment facilities
  - maintenance schedules and reporting
  - sampling and testing locations, techniques and frequencies
  - record keeping and reporting.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Trade waste



# NWP431A Investigate, rectify and report on trade waste incidents

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to investigate trade waste incidents, make arrangements for rectification and to complete reports.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for trade waste officers or inspectors with a specific responsibility for investigating trade waste incidents, identifying the source of the problem, arranging corrective action and compiling comprehensive reports.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Analyse trade waste incident location.</b>	1.1 Identify and confirm the location and nature of <i>trade waste</i> incidents. 1.2 Assess the extent of incidents and the possible effects. 1.3 Implement actions or make recommendations, as required, to minimise potential harm. 1.4 Notify relevant organisations and individuals. 1.5 Conduct inspections and sampling of incident locations and environs and analyse and report findings and results.
<b>2 Investigate the cause and effect of trade waste incidents.</b>	2.1 Identify and confirm the wastewater catchment for incident locations. 2.2 Analyse the wastewater catchment for possible sources of unauthorised or illegal discharge. 2.3 Schedule inspections of potential sources of unauthorised or illegal discharge and make appropriate preparations. 2.4 Investigate the possible effects of trade waste incidents and assess the level of severity.
<b>3 Identify incident source and arrange rectification.</b>	3.1 Conduct inspections of potential sources and gather and record evidence. 3.2 Analyse evidence and where possible, confirm the correct source of unauthorised or illegal trade waste discharge and complete required documentation. 3.3 Identify, analyse and select methods for rectifying problems. 3.4 Consult appropriate personnel within the identified customer organisations and advise of rectification requirements and incident repercussions.
<b>4 Compile trade waste incident reports.</b>	4.1 Record and process data and information relating to investigations and evidence gathered according to <i>organisational and statutory requirements</i> . 4.2 Compile, process and distribute incident reports, including rectification arrangements according to organisational requirements.
<b>5 Conduct post incident monitoring to ensure ongoing compliance.</b>	5.1 Adjust trade waste treatment and discharge monitoring schedules as required and prepare and apply a post incident monitoring plan. 5.2 Correctly select, fit and use personal protective equipment. 5.3 Identify and investigate breaches of the trade waste discharge provisions and report the results and/or recommendations according to organisational requirements.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- interpret and review hydraulic and site plans
- identify and evaluate trade waste-producing processes
- identify and select appropriate remedial measures
- evaluate process and wastewater system inputs and outputs
- use appropriate wastewater sampling and preservation techniques for onsite and laboratory testing
- develop monitoring plans and coordinate measuring, testing and sampling activities
- interpret and evaluate sample analysis data
- plan and conduct investigations
- assess environmental impact using ISO 14001 where appropriate
- assess waste treatment methods, processes, plant and equipment
- negotiate and communicate
- prepare comprehensive and accurate written reports
- interpret and apply legislation and policies applicable to trade waste
- use appropriate personal protective equipment for protection against physical, chemical and biological hazards.

#### Required knowledge:

- relevant legislation
- relevant enterprise policies for trade waste management
- water quality parameters of significance to the wastewater system
- trade waste treatment methods and processes
- impact and interaction of pollutants and toxins
- remedial measures relevant to customer base and associated risk
- basic hydraulics, chemistry and/or equivalent science
- investigation procedures
- report writing procedures
- range of appropriate measuring, testing and sampling procedures
- customer expectations and requirements
- occupational health and safety legislation
- personal protection and safety precautions for wastewater sampling, including the requirements for relevant inoculations, such as:
  - Q Fever
  - Hepatitis A and B
  - Polio
  - Tetanus
  - Diphtheria.



## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to investigate, rectify and report on trade waste incidents, including:

- identifying and analysing incident locations
- assessing the type and extent of incident impact
- assessing the trade waste catchment and identifying possible sources of the problem
- investigating possible sources and identifying the instigators of the incidents
- investigating the instigating organisations and negotiating rectification measures
- completing comprehensive reports appropriate for prosecutions.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

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and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Trade waste*** may include:

- the liquid waste generated by any:
  - industry
  - business
  - manufacturing process
  - community/public facilities
  - commercial activities
  - trade waste does not include domestic wastewater.

***Organisational and statutory requirements*** may include:

- relevant legislation, for example:
  - the Environmental Protection Act
  - Environment Protection and Biodiversity Conservation Act
  - Waste Minimisation and Management Act
  - the Water Act
  - local by-laws
  - International Standards, for example:
    - ISO 14000 standards.
    - Australia/New Zealand Standards, for example:
      - National Plumbing and Drainage Code AS/NZS 3500
  - relevant industry codes of practice for the management of trade waste, for example:
    - industry Code of Practice for the Photographic Industry (PURE)
    - National Health and Medical Research Council's (NHMRC) National guidelines for waste management in the health care industry, 1999
    - state plumbing and drainage code of practice
  - requirements of regulatory authorities, such as:
    - Water Authorities
    - WorkCover
    - EPA
    - Health Department
- local council.



**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Trade waste

# NWP432A Contribute to continuous improvement of quality systems

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to understand and implement quality systems in the water industry and to identify opportunities for improvement in quality outcomes for the organisation.

## Application of the Unit

**Application of the unit** This unit is required by water industry technicians or supervisors with a responsibility for the implementation of quality systems.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Interpret and communicate quality system requirements</b>	<p>1.1 The accreditation requirements for relevant water <i>quality systems</i> are interpreted, understood and communicated to work colleagues.</p> <p>1.2 The <i>implications of non-conformance</i> with quality accreditation requirements are identified and communicated to work colleagues.</p> <p>1.3 Standard operating procedures are regularly reviewed to ensure compliance with current quality accreditation and legislative requirements.</p>
<b>2 Implement quality systems</b>	<p>2.1 Individual roles and responsibilities in quality system implementation are defined.</p> <p>2.2 Standard operating procedures are implemented to ensure compliance with quality systems.</p> <p>2.3 Relevant data is recorded for quality system monitoring.</p> <p>2.4 Observations of non-conformance with quality accreditation requirements are recorded and reported promptly.</p>
<b>3 Identify and correct quality system implementation problems</b>	<p>3.1 System monitoring data is analysed to identify variances that indicate abnormal or sub-optimal performance.</p> <p>3.2 Non-conformance reports are reviewed to identify contributing factors.</p> <p>3.3 Corrective action to remove or control the risk of sub-optimal performance is identified.</p>
<b>4 Contribute to improvement of quality system implementation</b>	<p>4.1 Recommendations for continuous improvement of work practices, methods, equipment and procedures are developed to ensure continued compliance with quality accreditation requirements.</p> <p>4.2 All relevant work colleagues are consulted to refine recommendations.</p> <p>4.3 Recommendations for quality system implementation improvements are documented and the required modifications to standard operating procedures are noted.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- interpret a range of complex and technical documents, including relevant:
  - regulatory, legislative, licensing and organisational requirements
  - codes and standards
  - specifications
  - organisational policies
- communicates effectively with a range of relevant parties to articulate complex ideas clearly and discuss organisational issues
- analyse and evaluate reports and reference materials
- participate in ensuring compliance with standards, regulations and policies
- interpret, maintain and check records and documents
- identify opportunities for improved water management
- collaboratively and effectively implement operational plans
- monitor assets to ensure performance meets specifications in management plans
- work collaboratively with relevant stakeholders
- analyse problems and apply appropriate remedial solutions
- perform various calculations to provide data for the analysis and development of options and solutions
- identify hazards and develop appropriate responses to control and mitigate risks in accordance with regulations and legislation
- participate in the provision of appropriate information to inform workplace processes
- understand capabilities and limitations of plant, equipment and tools
- manage work priorities
- use information effectively to improve work performance.

#### Required knowledge:

- relevant legislation, standards and workplace policies and procedures
- relevant quality standards and systems, for example:
  - Australian Drinking Water Guidelines
  - HACCP
  - ISO 9000 series quality management and quality assurance standards
  - ISO 14001 environmental management systems
- quality improvement tools and techniques including statistical process control
- communication channels and consultative arrangements
- procedures for addressing non-compliance
- risk assessments
- control charts and control limits.



## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement quality systems in the water industry, including:

- interpreting and communicating the accreditation requirements for, and implications of non-conformance with, relevant quality systems
- implementing and reviewing standard operating procedures to ensure compliance
- monitoring quality systems and reporting non-conformance with quality accreditation requirements
- analysing historical variance and non-conformance data and proposing improvements
- consulting work colleagues regarding recommendations for continuous improvement of quality system implementation
- recording recommendations.

#### **Context of and specific resources for assessment**

Access to the workplace and resources, including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.



## Range Statement

### 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.

***Quality systems*** may include:

- Australian Drinking Water Guidelines
- HACCP
- ISO 9000 series quality management and quality assurance standards
- ISO 14001 environmental management systems.

***Implications of non-conformance*** may include:

- loss of accreditation
- threat to public health
- adverse environmental impact
- breach of legislation incurring penalties.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Common

## NWP440A Supervise conduit inspection and reporting

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to supervise or manage the inspection and reporting of the condition and features in sewer and stormwater conduits using specialised CCTV equipment.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for people who supervise or manage work involved in the inspection and reporting of the condition and features in sewer and stormwater conduits using specialised CCTV equipment. It is also applicable to people who prepare inspection reports from data supplied by specialised CCTV sewer inspection operators.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Determine inspection reporting requirements</b>	1.1 Determine the <i>inspection reporting standard</i> and <i>special inspection and reporting requirements</i> of the client or asset owner from specifications and/or instructions. 1.2 Obtain <i>plans and maps of assets</i> to be inspected and identify relevant asset data. 1.3 Seek clarification of inspection reporting requirements from the client/asset owner for unusual or non-routine inspections. 1.4 Verify the competence of operators undertaking the inspection.
<b>2 Review video images, data and reports from inspections.</b>	2.1 <i>Check video records</i> of inspections. 2.2 Compile documentation from inspection and check for completeness and accuracy. 2.3 Recognise unsatisfactory video images and other non-compliant data and submit non-compliance reports to the operator. 2.4 Label and reference inspection information according to specifications and/or enterprise procedures.
<b>3 Identify and code defects and other features from video images of conduit inspection.</b>	3.1 Identify and code structural defects, service conditions and other features of the <i>conduit</i> in accordance with industry code and/or specifications. 3.2 Record asset and inspection data using appropriate software in accordance with industry code and/or specifications. 3.3 Investigate and report unrecognisable defects, service conditions or other features. 3.4 Identify a conduit at risk of imminent failure and communicate details to the system operator/asset owner according to <i>operational procedures</i> . 3.5 Confirm defects or malfunctioning of maintenance holes, pits or other access structures with the operator and report in accordance with industry code and/or specifications.
<b>4 Prepare conduit inspection reports for client.</b>	4.1 Compile <i>inspection reports</i> and present to the client in the format required by the industry code/specifications or enterprise practice. 4.2 Follow <i>inspection video and data security procedures</i> in accordance with the specifications and or enterprise procedures.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- identify structural defects, service conditions and other features in a range of different conduits
- apply industry inspection reporting code requirements
- use data capture software
- access and interpret conduit details from asset information systems (GIS), construction drawings, plans/maps, house service diagrams
- identify inspection reporting requirements in specifications
- interpret policies, procedures and standards
- communicate with clients and operators.

#### Required knowledge:

- industry inspection reporting code
- data capture, recording and reporting software
- asset information systems
- operational plans/maps
- design plans for construction
- features of conduits used in Australia or operating area for gravity sewer and stormwater construction over the last 100 years
- construction and operation of sewerage and stormwater systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to supervise or manage the inspection and reporting of the condition and features in sewer and stormwater conduits using specialised CCTV equipment Including:

- identifying and correctly coding all critical defects and or features of conduits observable in inspection video records
- recognising poor quality, inaccurate and other non-compliant video images and data from conduit inspections
- interpreting correctly all relevant asset information on maps, plans and drawings of the conduit provided by the asset owner/operator/client.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence only taken at the point when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

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experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Inspection reporting standards*** may include:
- Conduit inspection reporting code of Australia WSA 05 2006
  - Australian conduit condition evaluation manual
  - other enterprise or national reporting codes.
- Special inspection and reporting requirements*** may include:
- pre-cleaning preparation of asset
  - detailed inspection of certain defects and/or features in the conduit
  - type and number of photographs / video clips of defects and or features
  - measurement and reporting of operational or conduit parameters such as gas concentrations.
- Plans and maps of assets*** may include:
- geographic information systems (GIS)
  - construction drawings
  - manual systems
  - hard copy systems.
- Checkvideo records*** includes:
- image quality
  - completeness
  - camera operation
  - compliance with the inspection reporting standard and special inspection or reporting requirements.
- Conduit*** may include:
- pipes manufactured from:
  - vitrified clay (earthenware)
  - reinforced concrete
  - polyvinyl chloride (PVC)
  - polyethylene
  - polypropylene
  - unlined cast iron
  - cast iron cement lined
  - asbestos cement
  - ductile iron cement lined
  - glass reinforced plastic
  - mild steel cement lined
  - profiled thin gauge steel
  - other conduits include:



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- concrete box culverts
  - circular or oviform brick
  - circular or oviform cast in situ concrete
  - circular, rectangular or variable cross section stone masonry block
  - lined pipes or other cross sections
  - access structures such as:
    - maintenance holes
    - drainage pits
    - maintenance shafts.
  - communication and reporting protocols
  - standard operating procedures
  - organisational policies.
  - videotapes
  - CDs, DVDs or other digital media
  - computer generated reports in a variety of formats
  - asset information such as plans, maps, asset location, number, age and type
  - photographs.
  - backup copies of computer files
  - tracking of tapes and disks
  - authorised deletion of files.
- Operational procedures* may include:
- Inspection reports* may include:
- Inspection video and data security procedures* may include:

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# NWP504A Collect and manage hydrometric station survey data

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to use appropriate survey equipment to collect survey data at monitoring stations and to process and manage the data for hydrometric purposes.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for assistant hydrographers, field hydrologists and water operators responsible for reporting water quality, volume and flow in water systems.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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 tasks you need to be able to perform, to demonstrate that you can achieve 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and assess survey requirements.</b>	<p>1.1 Planned survey exercises directly relate to the desired outcome and required <i>standard processes and software</i>.</p> <p>1.2 Identify the location and value of survey reference marks from maps and plans.</p> <p>1.3 Choose and justify appropriate survey techniques for specific <i>hydraulic conditions</i> and hydrographic purposes.</p> <p>1.4 Identify and evaluate the source of levelling errors and misclosures.</p> <p>1.5 Plan and manage the logistics and personnel to ensure effective outcomes and resource management.</p> <p>1.6 Apply correct care procedure for storage, transport and use of survey equipment.</p> <p>1.7 Assess and address occupational health and safety issues that may be encountered during the surveying exercise taking appropriate risk management strategies.</p> <p>1.8 Apply for and confirm appropriate authorisations for entry to property for the purpose of carrying out survey exercise.</p>
<b>2 Operate survey equipment.</b>	<p>2.1 Set up survey equipment and use <i>mathematical techniques</i> to check for correct operation and prepared for use.</p> <p>2.2 Carry out collimation test to check the level for accuracy.</p> <p>2.3 Select survey equipment for suitability and use correctly and safely according to operating procedures.</p>
<b>3 Select and survey monitoring sites.</b>	<p>3.1 Identify required survey reference marks (bench marks).</p> <p>3.2 Establish cease-to-flow level of controlling feature.</p> <p>3.3 Identify and assess high-flow cross section and sectional control by survey.</p> <p>3.4 Survey multiple cross sections of channels to determine the profile of the channel in the gauging station reach.</p> <p>3.5 Identify and assess groundwater monitoring site survey reference points</p>
<b>4 Document survey and data results.</b>	<p>4.1 Correctly and accurately document and store results and verify in corporate database according to organisation and industry standards.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- plan and map reading skills sufficient to locate features, find survey reference marks and plot locations
- level preparation, set-up and operation
- circular level check
- use procedure for elimination of parallax
- use procedure for conducting Collimation test
- audit the condition of staves, bubble level, measuring tapes
- prepare and load survey equipment for transportation
- identify common types of measuring tapes used in survey
- care and maintenance of measuring tapes
- preparation and holding of staves
- use a compass to determine a bearing position
- operation of a change point
- data capture and file management
- horizontal distance measurement by stadia
- physically identify an appropriate survey reference mark
- apply sightings and standard error checks.

#### Required knowledge:

- mathematical and other scientific techniques relevant to the analysis of hydrometric data
- interaction of physico/chemico parameters of the process being monitored and the impact on data being recorded
- sensor/system characteristics and signal processing/algorithms, specifically with chemical sensors
- computer software relevant to the analysis and archiving of hydrographic data
- water sampling and testing procedures
- occupational health and safety procedures
- policies and standard operating procedures
- procedures for use of remote contact communication systems.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to use appropriate survey equipment to collect survey data at monitoring stations and to process and manage the data for hydrometric purposes including:

- gathering and interpreting complex documentation and applying to the development and maintenance of rating curves
- analysing and verifying data using standard procedures, software and databases
- preparing clear and accurate reports
- storing and archiving data
- identifying, reporting and providing solutions to a range of flow conditions.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence require 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

## EVIDENCE GUIDE

- time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Standard processes and software*** may include:

- standards relevant to the monitoring network including:
- AS 3778 for water measurement installations
- WMO/Bureau of Meteorology guidelines for siting of meteorological sensors and systems
- best practice methodology where standards are not available or applicable
- software for logical control device programming (maybe system specific or generic software) to automate control, sampling and alarming processes
- water data base management software for triggering alarms, notifications, advice to relevant authorities and management for actions
- procedures for:
- data logging (programming interrogation, data downloading, data security)
- procedures for:
- data processing
- storage and presentation
- conversion of raw logger file data to channel data in date/time/value format
- deletion/inclusion/correction
- quality codes/comments
- check
- archive
- storing ancillary data
- pluviographs
- hyetographs
- hydrographs
- rating curves
- tables
- procedures for the measurement of surface slopes and flood slopes
- procedures for the development, maintenance and



## RANGE STATEMENT

extension of rating curves

- computation of flow from stage data and rating curves
- software:
- Kisters - Hydstra
- Scientific Software Group - AquaChem
- Microsoft - Excel
- web-based development tools for presentation and reporting of data.

*Hydraulic conditions* may include:

- rapidly rising and falling stages
- tail water and backwater affected
- tidal effects
- transitional from calibrated to channel.

*Mathematical techniques* may include:

- logarithmic transformation
- conversion of units
- graphical analysis
- gauging calculations
- calculation of sediment load, sediment yield and sediment deposition.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Hydrography

## **NWP505B Implement and manage environmental management policies, plans, procedures and programs**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to manage activities associated with the implementation and management of environmental management policies, plans, procedures and programs. The ability to consult with stakeholders effectively and interpret complex information is central to effective performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers with responsibility for environmental management within the organisation.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Gather environmental management information.</b>	<p>1.1 Read, review and interpret the organisation's environmental policies and plans against <i>current environmental legislation</i> and perceived stakeholder attitudes and expectations.</p> <p>1.2 Identify all stakeholders and their relationship with the enterprise and their impact on, or relationship with, policies and plans.</p> <p>1.3 Identify the available resources to implement policies and plans.</p> <p>1.4 Confirm responsibilities and authorities as outlined in the policies and plans.</p> <p>1.5 Establish best practice procedures for the implementation of management plans.</p>
<b>2 Implement and monitor environmental policies and plans.</b>	<p>2.1 Develop and apply <i>environmental management processes</i> and workplace procedures to achieve policy and plan objectives and Performance Criteria.</p> <p>2.2 Monitor the effectiveness of policies and plans against objectives, timelines and key performance indicators.</p> <p>2.3 Audit environmental management processes and workplace procedures.</p> <p>2.4 Review and modify processes and procedures to achieve policy and plan objectives.</p>
<b>3 Identify environmental impacts and assess risks.</b>	<p>3.1 Identify, quantify and report existing and potential events that may affect the environment.</p> <p>3.2 Identify, quantify and report existing and potential environmental management risks.</p> <p>3.3 Identify, quantify and report work activities that may cause harm to the environment according to enterprise procedures.</p>
<b>4 Implement and monitor the procedures for quantifying environmental impacts and controlling risks.</b>	<p>4.1 Implement work procedures to control risks or remedy damage.</p> <p>4.2 Monitor risk control measures and report results according to workplace procedures.</p> <p>4.3 Identify inadequacies in risk control measures, report to the appropriate authority and remedy according to organisational procedures.</p> <p>4.4 Quantify and record environmental impacts according to legislative requirements and workplace procedures.</p> <p>4.5 Report adverse environmental impacts and make recommendations to minimise the impacts according to enterprise and legislative requirements.</p>
<b>5 Implement and</b>	<p>5.1 Implement workplace procedures for managing incidents of</p>

## ELEMENT

## PERFORMANCE CRITERIA

**monitor procedures for dealing with environmental incidents.**

environmental significance or harm to ensure prompt control and remediation.

5.2 Investigate *incidents of environmental impact* to identify their cause according to investigation procedures or environmental audit requirements.

5.3 Implement control measures to prevent recurrence and minimise risks of events according to the environmental policy and plan.

5.4 Record and report incidences of environmental impact, significance or harm according to enterprise procedures and legislative requirements.

**6 Maintain environmental records.**

6.1 Accurately and legibly complete *environmental management documentation* for the work area according to workplace and legislative requirements.

6.2 Store environmental records for easy access and review according to the policy and plan requirements.

6.3 Regularly review and assess environmental records are to identify long term trends and impacts.

6.4 Report results of record reviews according to the policy and plan requirements.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- applies relevant legislative requirements
- applies enterprise environmental policies
- consults and communicates with internal and external groups and/or individuals
- assesses environmental risks
- applies control procedures
- responds to emergencies
- manages records.

#### **Required knowledge:**

- enterprise consultation processes
- economic systems and development needs
- enterprise emergency response requirements
- occupational health and safety legislation
- enterprise environmental policies
- risk assessment procedures
- environmental risk control procedures
- relevant legislative requirements
- environmental legislation
- environmental management records.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to manage activities associated with the implementation and management of environmental management policies, plans, procedures and programs including:

- gathering and interpreting information (including policies, procedures, legislation, Australian and New Zealand standards, best practice guidelines) relating to environmental management
- implementing environmental management plans in consultation with relevant stakeholders
- monitoring the effective implementation of environmental management plans
- assessing and managing risks
- taking effective steps to ensure the remediation of environmental problems or impacts
- collecting, recording, assessing and reporting data associated with the performance of the environmental management plan.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Current environmental legislation*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- relevant government and quasi government policies and regulations
- relevant community planning and development agreements (eg land care agreements).

***Environmental management processes*** may include:

- minimisation of those factors that contribute to environmental degradation
- minimisation, directly or indirectly, of the production of greenhouse gases. These contributing factors might include the:
  - minimisation of waste materials
  - correct use of enterprise vehicles and machinery
  - reuse or recycling of trade materials where possible
  - overall reduction of energy usage through general awareness
  - use of appropriate technologies
  - licensing agreements
  - the proper disposal of waste materials
  - restriction of burning off
  - correct handling of toxic substances
  - containment of chlorofluorocarbons and other hazardous substances.

***Incidents of environmental impact*** may include:

- emissions to air
- releases to/of water
- releases to land
- disposal of waste
- contamination of land
- impact on communities
- destruction of habitat
- use of energy sources
- waste generation processes and technologies
- extraction of water

## RANGE STATEMENT

- System adjustments* may include:
- changes to water temperature
  - changes to water salinity
  - regulation of flow
  - land use.
  - pH correction
  - dissolved oxygen levels
  - recirculation rates
  - chemical additives.
- Environmental management documentation* may include:
- information on applicable environmental laws or other requirements
  - complaint records
  - training records
  - process information
  - process operational logbooks
  - inspection, maintenance and calibration records
  - relevant contractor and supplier information
  - incident reports
  - information on emergency preparedness and response; records of significant environmental impacts
  - audit results
  - management reviews.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Common

# NWP508A Apply principles of hydraulics to pipe and channel flow

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit describes the competencies required to use hydraulic principles and calculations of theoretical flows. An understanding of the processes required to collect data accurately, interpret data, verify data and apply theoretical techniques to produce flow data are essential to performance.

## Application of the Unit

**Application of the unit** This unit covers generic competency for a range of technical and operational work roles in water flow calculations.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
1 Calculate energy losses in pipe flow.	1.1 Review measurements and compare against expected trends. 1.2 Use <i>standard processes and software</i> to check, edit, verify and audit data. 1.3 Use standard processes to identify, estimate, adjust and justify data and review inconsistent data on <i>flow conditions</i> . 1.4 Prepare records in a format suitable for dissemination.
2 Calculate hydraulic and energy gradient for pipelines.	2.1 Prepare pipeline design <i>charts</i> using standard formulae. 2.2 Identify the limitations of formulae. 2.3 Identify variations in <i>roughness coefficients</i> . 2.4 Calculate the pressure in pipeline systems using the hydraulic gradient line. 2.5 Calculate the pipe discharge from reservoirs.
3 Calculate flow in open channels.	3.1 Identify the <i>methods used for measuring flows</i> in open channels. 3.2 Use the <i>formulae for calculating flows</i> in open channels. 3.3 Distinguish the <i>characteristics of open channels</i> . 3.4 Distinguish the uses of different measuring instruments and devices used in open channels 3.5 Assess the <i>hydraulic principles</i> which apply to different <i>meters</i> . 3.6 Identify the limitations of the meters.
4 Calculate flows through notches and weirs.	4.1 Identify the methods used for measuring flows in notches and weirs. 4.2 Use the formulae for calculating flows in notches and weirs. 4.3 Distinguish the applications and <i>characteristics of notches and weirs</i> . 4.4 Distinguish the uses of different measuring instruments and devices used for notches and weirs. 4.5 Assess the hydraulic principles which apply to different meters. 4.6 Identify the limitations of the meters.
5 Calculate proportions for an economic section.	5.1 Calculate the proportions of rectangular, trapezoidal and circular channels for maximum discharge. 5.2 Use a partial flow chart to identify the depth of flow for maximum discharge and maximum velocity.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- draw velocity distribution curves for fluids in pipes or channels with both laminar flow and turbulent flow
- use the Moody diagram
- use data to determine the value of roughness
- use simple equations for determining pipe friction with their appropriate application
- calculate head losses in non-circular pipes
- calculate minor energy losses associated with enlargements, contractions, valves, fittings and bends
- calculate the flow in a pipe using data regarding minor energy losses
- use AS 2200 for calculating minor losses
- apply flow formulae to different open channel cross-sections in developing the proportions for an economic section
- calculate the flow in pipelines
- calculate the gradual varied flow profiles in uniform channels when the discharge is known
- use analytical tools and formulae
- interpret and apply technical documentation to the collection, analysis and reporting of hydrometric data
- identify potential or actual operational problems
- use computer systems
- use recording and reporting systems.

#### Required knowledge:

- application of matrix algebra to systems of linear equations
- graphical and algebraic methods for solving systems of linear, quadratic, exponential, logarithmic and trigonometric equations
- principles of fluid statics, fluid dynamics and hydraulic mechanics
- Pascal's Law and hydrostatic effect on submerged surfaces
- distinction between laminar and turbulent flow
- Hagen-Poiseuille equation
- Darcy-Weisbach equation
- Bernoulli's equation
- the effect of velocity variation on velocity head
- equations for calculating the approximate value of the friction factor (
- smooth and rough wall turbulent flow
- minimise pipeline losses

## **REQUIRED SKILLS AND KNOWLEDGE**

- the characteristics of flow through notches/weirs including the use of these in channel flow measurement
- sampling and testing procedures
- policies and standard operating 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to use a range of hydraulics principles and calculations of theoretical flows including:

- calculating energy in pipe flows
- calculating hydraulic and energy gradient for pipelines
- calculating flow in open channels
- calculating flows through notches and weirs
- calculating proportions for an economic section.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency



## EVIDENCE GUIDE

demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Standard processes and software*** may include:

- standards relevant to the monitoring network including ASÂ 3778 for discharge ratings, WMO, best practice methodology where standards are not available or applicable
- procedures for the measurement of surface slopes and flood slopes
- procedures for the development, maintenance and extension of rating curves
- computation of flow from stage data and rating curves
- software:
  - Kisters - Hydstra
  - Scientific Software Group - AquaChem,
  - Microsoft - Excel
  - web-based development tools for presentation and reporting of data.

***Flow conditions*** will include:

- laminar flow
- turbulent flow
- smooth and rough pipe and channel surfaces
- full pipe flow
- submerged flow conditions
- backwater
- critical flow, sub critical and supercritical
- uniform flow
- rapidly changing flow
- weir and flumes behaviour under various flow conditions.

***Charts*** include:

- Colebrook-White charts
- Hazen and Williams charts
- Manning charts.

***Roughness coefficients*** include:

- biological growths and other obstructions
- slime deposits
- incrustations
- detritus

## RANGE STATEMENT

- general debris
  - deterioration of unlined ferrous surfaces, because the bore may be diminished by oxide formations
  - irregularities at joints:
  - eccentricity
  - abrupt decrease of diameter
  - protrusions of mortar or other jointing materials
  - inadequate closure, especially if this has permitted tree roots to enter
  - amount and size of solids being transported
  - disturbances by flow from branch lines especially in sewers.
- Methods used for measuring flows* include:
- container method
  - tilt tank method
  - trajectory method.
- Formulae for calculating flows* includes:
- Chezy equation
  - Colebrook-White
  - Hazen and Williams
  - Darcy-Weisbach
  - Manning equation.
- Characteristics of open channels* include:
- types of open channel
  - steadiness
  - uniformity
  - state of open channel flow
  - laminar, transitional and turbulent flow
  - critical, subcritical and supercritical flow.
- Meters* include:
- mechanical meters such as:
  - the displacement type
  - the inferential type.
  - pressure meters such as:
  - pitot tube
  - orifice plate
  - Venturi meter.
- Characteristics of notches and weirs* will include:
- type of the crest
  - shape of the notch
  - crest and conditions.
- Hydraulic principles* will include:
- standards relevant to the monitoring network including AS 3778 Measurement of water flow in open channels and AS 2200 Design Charts for water supply and sewerage for calculating pipe and channel flows

## **RANGE STATEMENT**

- Archimedes's Principle
- Bernoulli's Equation
- Newton's Laws of Motion
- hydraulic gradient and total energy line
- boundary layer theory
- Reynold's Number
- Pascal's Law
- theory of gated structures
- hydrostatic pressure
- fluid dynamics
- Moody Diagram
- Manning's Formula
- Chezy's Formula
- specific energy formula
- Darcy-Weisbach Equation
- Hagen-Poiseuille Equation.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Hydraulics

# NWP509A Collect, verify and report hydrometric time series data

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit describes the competencies required to compile, analyse and verify data and produce hydrometric data reports to support organisational decision making. An understanding of the processes required to collect data accurately, interpret data, verify data and produce clear reports that conform to organisational standards are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for assistant hydrographers, field hydrologists and water operators responsible for reporting water quality, volume and flow in water systems.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for collection of data.</b>	<p>1.1 Identify parameters and procedures for collection of <b><i>hydrometric data</i></b>.</p> <p>1.2 Identify client's data and reporting requirements.</p>
<b>2 Retrieve time series data.</b>	<p>2.1 Retrieve and manage data according to organisational procedures.</p> <p>2.2 Reset data logger according to procedures.</p> <p>2.3 Apply <b><i>field verification checks</i></b> and complete field documentation.</p>
<b>3 Verify hydrometric data.</b>	<p>3.1 Select data to be verified.</p> <p>3.2 Archive raw data.</p> <p>3.3 Prepare working copy of data.</p> <p>3.4 Review <b><i>verification information</i></b> to determine trends and identify proposed adjustments to data.</p> <p>3.5 Use historical data, nearby sites and related parameters to validate data to identify <b><i>data irregularities</i></b> and ensure <b><i>data integrity</i></b>.</p> <p>3.6 Use <b><i>standard processes and software</i></b> and <b><i>mathematical and scientific techniques</i></b> to check, edit, verify, adjust and qualify data.</p> <p>3.7 <b><i>Estimate failed periods</i></b> required by client.</p> <p>3.8 Document checks and adjustments.</p>
<b>4 Prepare reports.</b>	<p>4.1 Prepare <b><i>standard reports</i></b> to check integrity of verified data.</p> <p>4.2 Prepare <b><i>client specific reports</i></b>.</p> <p>4.3 Prepare verified data, documentation and reports for authorisation.</p> <p>4.4 File authorised information according to organisation procedures.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

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

#### **Required skills:**

- communicate technical information and use communication technology with colleagues, management and clients
- assess the performance and limitations of the monitoring systems and sites employed in monitoring the network/catchment
- identify and assess the characteristics of hydrographs and pluviometer traces
- apply analytical tools for hydrometric data
- interpret and apply technical documentation to the collection, analysis and reporting of hydrometric data
- identify and respond effectively to operational problems
- use information and data management computer systems.

#### **Required knowledge:**

- the hydrometric cycle and its impact on the conditions and objectives of hydrometric time series data management
- measurement methods for collection and checking continuous hydrometric data in the field
- continuous data verification techniques
- mathematical and scientific techniques relevant to the analysis of hydrometric data
- computer software relevant to the analysis and archiving of hydrographic data
- water sampling and testing procedures
- policies and standard operating procedures for data analysis.

## 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to compile, analyse and verify data and produce hydrometric data reports to support organisational decision making including:

- gathering, interpreting complex documentation and applying it to the specification of hydrographic data collection and reporting procedures
- collecting samples accurately
- analysing and verifying data using standard procedures, software and databases
- preparing clear and accurate reports
- storing and archiving data
- identifying, reporting and resolving potential and actual problems.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence require 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



## EVIDENCE GUIDE

separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Hydrometric data*** will include:

- water level (streams, lakes)
- rainfall
- groundwater
- soil moisture
- evaporation
- radiation
- wind
- temperature
- EC.

***Field verification checks*** will include:

- staff gauge reading
- well tape check
- survey level
- peak level indicators
- flood marks
- rainfall storage and/or calibration check
- EC in-situ meter reading
- groundwater down the casing tape check.

***Verification information*** may include:

- station visit information
- operator comments
- photographs
- embedded comments
- secondary checks
- stage:
- staff gauge
- peak level indicator
- flood mark, surveyed water level
- tape over orifice
- rainfall collected storage
- EC in-situ readings
- laboratory analyses
- related traces - comparison with nearby sites, comparison of variables:
- stage v rain

## RANGE STATEMENT

*Data irregularities* will include:

- stage/EC
- EC v water temperature.
- Characteristics of continuous traces
- recorder and site:
- velocity past inlet or orifice
- datum changes
- interference and vandalism
- inadequate recording (log) interval
- clock irregularities and stoppages
- control:
- debris on control
- siltation (of stilling pool)
- wind
- stepping
- weir aeration
- control interference
- tailwater
- leakage
- floatwell systems:
- lag (ratio of well to inlet diameter)
- leaking well
- groundwater inflow to well
- inlet blockages
- float catching
- float line faults
- friction in float system
- siltation (of inlets)
- gas purge systems:
- gas leak
- gas expiry
- lag (bubble rate)
- orifice stability (datum)
- siltation (of orifice)
- pluviometer:
- interference and vandalism (extraneous fluid poured into gauge)
- equipment faults - double counts
- missed counts
- storage discrepancy.
- parameter relationships:

*Data integrity* will include:

## RANGE STATEMENT

*Standard processes and software* may include:

- stage vs stage
- flow vs flow
- rain vs rain
- rain vs stage
- stage vs water quality
- stage:
- stage / stage (HYPLOTXY) or flow / flow correlation plots
- double mass curves (HYMASS)
- pluviometer:
- HYPLOTXY correlation plots
- double mass curves.
- standards relevant to the monitoring network including:
- AS 3778 for water measurement installations
- WMO / Bureau of Meteorology guidelines for siting of meteorological sensors and systems
- best practice methodology where standards are not available or applicable
- software for logical control device programming (maybe system specific or generic software) to automate control, sampling and alarming processes
- water data base management software for triggering alarms, notifications, advice to relevant authorities and management for actions
- procedures for data logging:
- programming
- interrogation
- data downloading
- data security
- procedures for data processing, storage and presentation:
- conversion of raw logger file data to channel data in date/time/value format
- deletion/inclusion/correction
- quality codes/comments
- check
- archive
- storing ancillary data
- pluviographs
- hyetographs
- hydrographs
- rating curves

## RANGE STATEMENT

- tables
  - procedures for the measurement of surface slopes and flood slopes
  - procedures for the development, maintenance and extension of rating curves
  - computation of flow from stage data and rating curves
  - software:
    - Kisters - Hydstra
    - Scientific Software Group - AquaChem,
    - Microsoft - Excel
  - web-based development tools for presentation and reporting of data.
- Mathematical and scientific techniques* may include:
- logarithmic transformation
  - conversion of units
  - graphical analysis
  - gauging calculations
  - calculation of loads and yields.
- Estimated failed periods* will include:
- verification information
  - historical data
  - nearby sites and related parameters
  - copy and paste
  - applying peak stage level or total stored rainfall checks
  - estimation using standard processes and software.
- Standard reports* may include:
- daily (HYDAY (stage, max and mean flow rate and flow total, rain
  - monthly (HYMONTH) - transposes (max/min)
  - annual (HYANN).
- Client specific reports* may include:
- flow duration HYFLOW
  - recurrence intervals (Flow: HYL3 - requires Peak Series to be updated)
  - runoff ratio
  - rainfall intensities
  - web-based presentation tools.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Hydrography

## NWP510A Develop and maintain ratings

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to establish relationships between variables such as stage versus flow, conductivity versus salinity. This unit requires understanding of the processes required to collect data accurately, interpret data, verify data and produce clear reports that conform to organisational and industry standards.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for assistant hydrographers, field hydrologists and water operators responsible for reporting water quality, volume and flow in water systems.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** 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

ELEMENT	PERFORMANCE CRITERIA
1 <b>Review individual measurements.</b>	1.1 Identify purposes of ratings. 1.2 Review measurements and compare against expected trends. 1.3 Use <i>standard processes and software</i> to check, edit and verify field data. 1.4 Correct and adjust inconsistent data.
2 <b>Develop rating curves.</b>	2.1 Analyse existing measurements to establish trends and compare with existing ratings. 2.2 Identify sources of error in ratings. 2.3 Prepare rating curves based on measurements and agreed formulae and <i>mathematical techniques</i> under a <i>variety of hydraulic conditions</i> and <i>control types</i> . 2.4 Confirm and verify existing trend or define new trend. 2.5 Develop rating curves which comply with industry and client requirements. 2.6 Use <i>theoretical methods</i> to create or extend ratings. 2.7 Document processes and observations to provide traceability and accountability for quality assurance. 2.8 standard formulas to create ratings for pre-calibrated measuring structures. 2.9 Apply quality codes to rating curves.
3 <b>Maintain rating curves.</b>	3.1 Confirm accuracy of rating curves using recent measurements and review trends and rating applicability. 3.2 Develop rating curves based on new information from reviews and changed conditions. 3.3 Retrieve and analyse current, historic and trend data using appropriate mathematical techniques and in accordance with organisational procedures. 3.4 Document processes and observations and adjustments made.
4 <b>Report rating curves.</b>	4.1 Check rating curves covers full stage range. 4.2 Prepare and store required <i>archival data</i> according to organisational procedures for data security. 4.3 Prepare and disseminate ratings in accordance with client requirements. 4.4 Make recommendations for future observations.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- collect and analyse data
- apply mathematical modelling and analytical tools
- interpret and apply technical documentation to the collection, analysis and reporting of hydrometric data
- identify and address potential or actual operational problems
- record information and prepare reports and interpret a range of organisational documents
- use computer systems and use various computer programs & spreadsheets to create ratings
- use remote work communication systems
- check hydrometric data for correctness and accuracy in preparation for creating ratings
- identify characteristics of ratings appropriate to various cross section types & flow regimes
- identify incorrect and impossible ratings
- adjust gaugings, hydrograph trace and ratings to a common datum
- create ratings manually using various methods
- create ratings for standard measuring structures
- develop rating techniques to handle seasonal rating changes
- identify the possibilities and limitations of scale models for generating ratings
- identify and recognise causes of progressive, cyclical and sudden rating changes
- identify backwater-affected stations and use appropriate techniques to rate them
- identify gradual stream changes and adopt appropriate rating techniques
- identify short-term rating changes, their causes and means of correctly processing them
- apply Student's T test to determine whether a new rating is required
- draw an accurate rating by hand
- fit a rating curve using a number of mathematical techniques available in HYDSYS HYRATED
- identify the probable error of a rating, and understand its significance
- identify gross errors in ratings and the data used to compile them
- apply appropriate quality codes to a rating
- identify the elements of a stream bed & channel that affect ratings
- estimate channel roughness from photographs
- calculate the overall roughness coefficient of a channel consisting of a number of elements
- use graphical logarithmic methods to extend a rating

## **REQUIRED SKILLS AND KNOWLEDGE**

- identify appropriate sections to use for slope-area flow calculations
- manually calculate flow rates using a set of cross sections and a long section
- use a spreadsheet to perform calculations
- make correct measurements and calculate flow rates through and over various structures.

### **Required knowledge:**

- mathematical and other scientific techniques relevant to the analysis of hydrometric data
- Student's T test
- the elements of a stream bed&channel that affect the rating
- the relationship between Chezy&Manning roughness coefficients
- computer software relevant to the analysis and archiving of hydrographic data
- the basis of statistical goodness of fit tests
- occupational health and safety procedures
- policies and standard operating 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.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to establish relationships between variables such as stage versus flow and conductivity versus salinity including:

- gathering and interpreting complex documentation and applying it to the development and maintenance of rating curves
- analysing and verifying data using standard procedures, software and databases
- preparing clear and accurate reports
- storing and archiving data
- identifying, reporting and providing solutions to a range of flow conditions.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- workplace specific equipment and technology
- supervision and experienced team members to provide observations, feedback and third party reports
- enterprise operating procedures and work allocation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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.

***Standard processes and software*** may include:

- standards relevant to preparation of rating
- procedures for the development, maintenance and extension of rating curves
- computation of flow from stage data and rating curves
- software (Kisters - Hydstra, Scientific Software Group - AquaChem, Microsoft - Excel)
- web-based development tools for presentation and reporting of data.

***Mathematical techniques*** may include:

- logarithmic transformation
- conversion of units
- graphical analysis
- gauging calculations
- calculation of sediment load, sediment yield and sediment deposition.

***A variety of hydraulic conditions*** may include:

- rapidly rising and falling stages
- tail water and backwater affected
- tidal effects
- transitional from calibrated to channel
- control sensitivity
- siltation & control changes.

***Control Types*** may include:

- sectional controls
- partial controls
- channel controls.

***Theoretical methods*** may include:

- Mannings
- Chezy
- A(D)
- HECRAS.

***Archival data*** may include:

- archive structure
- period of applicability
- rating equations.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Hydrography

## NWP511B Manage dam safety surveillance

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to plan, schedule, implement and report on dam safety surveillance.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for staff with a specific responsibility for managing the safety surveillance of large dams.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for dam safety surveillance.</b>	<p>1.1 Access and apply the Australian National Committee on Large Dams guidelines and other regulatory requirements.</p> <p>1.2 Develop safety surveillance policies, plans and procedures according to <b><i>organisational and statutory requirements</i></b>.</p> <p>1.3 Access and interpret <b><i>historical and design information</i></b>.</p> <p>1.4 Determine monitoring frequency and <b><i>surveillance sites</i></b> for inspecting dam structure conditions and behaviour.</p> <p>1.5 Assess and document dam behaviour and potential failure modes.</p> <p>1.6 Determine instrumentation requirements and data collection methods.</p>
<b>2 Implement dam safety surveillance plans.</b>	<p>2.1 Inform <b><i>stakeholders</i></b> of policies and plans.</p> <p>2.2 Develop <b><i>inspection</i></b> programs and implement inspection and monitoring procedures.</p> <p>2.3 Communicate procedures for the collection and recording of information to field staff.</p> <p>2.4 Collate, process, validate, record and store <b><i>data</i></b> from <b><i>instruments</i></b> and personnel.</p> <p>2.5 Analyse data and determine, record and evaluate structural, material and/or behavioural problems.</p>
<b>3 Complete safety surveillance reports.</b>	<p>3.1 Prepare and distribute clear and concise reports to meet the dam owners', stakeholders' and regulatory requirements.</p> <p>3.2 Communicate consequences of failure to dam owners and other stakeholders.</p> <p>3.3 Include recommendations for remedial action.</p> <p>3.4 Undertake economic evaluations, cost estimates and work schedules according to enterprise requirements.</p> <p>3.5 Assess the timeliness of all stages of communication and reporting.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- analyse and process data
- communicate
- use equipment and instruments
- interpret plans and charts
- produce reports
- Inspect and operate instruments.

#### **Required knowledge:**

- properties of stored water
- dam design principles
- materials science (eg corrosion, paint coating)
- communication systems
- relevant utilities
- principles of hydraulics
- principles of soil mechanics
- concrete structure
- strengths and deterioration
- construction procedure
- safe dam operating procedures
- principles of dam surveillance
- risk management techniques
- maintenance practices.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to plan, schedule, implement and report on dam safety surveillance including:

- planning and preparing for dam safety surveillance
- implementing dam safety surveillance plans
- completing safety surveillance reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based

## **EVIDENCE GUIDE**

activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Organisational and statutory requirements*** may include:

- environmental laws and policies
- by-laws and organisational policies
- Water Acts
- construction and occupational health and safety regulations
- public safety and disaster plans
- Australian National Committee on Large Dams guidelines
- state government or state committees
- asset management plan.

***Historical and design information*** may include:

- past surveillance reports
- observation and associated comments and reports
- original design plans
- design modifications
- construction records and reports
- survey information.

***Surveillance sites*** may include:

- earthen walls
- concrete walls
- hydraulic structures
- electrical equipment
- spillways
- outlets
- pipes
- conduits
- foundations
- mechanical equipment, such as:
- gates
- valves
- tunnels and galleries
- reservoir perimeter
- weirs.

***Stakeholders*** may include:

- dam owners
- water authorities
- government

## **RANGE STATEMENT**

- water consumers
  - downstream land owners
  - meteorological bureau
  - local government
  - emergency organisations
  - police
  - land care and water watch groups
  - industry.
- Inspections* may include:
- interaction and communication with employees and the general public
  - visual observation
  - use of electronic and/or computer equipment
  - specialist investigations such as drilling and core sampling
  - operational preparedness checks
  - specialist inspections.
- Data* may include:
- current and past monitoring records
  - flood information
  - seismic details
  - previous safety reviews
  - geological and foundation investigation reports
  - hydrometrical reports
  - past remedial works
  - past incidents
  - past surveillance reports
  - inspection reports
  - original design plans
  - design modifications
  - construction records and reports
  - operation and maintenance performance data.
- Instruments* may include:
- simple manual devices through to complex computer controlled systems.

## **Unit Sector(s)**

Not applicable.

## Competency field

**Competency field**      Dam safety

## **NWP512B Implement and manage catchment management plan**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to implement and manage activities in water catchments that impact on water yield and/or quality to ensure performance measures for the catchment management plan are met.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of water catchments.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for catchment management.</b>	1.1 Confirm performance measures for the catchment management plan. 1.2 Identify and interpret <i>catchment management requirements</i> . 1.3 Identify <i>user and customer</i> requirements that impact on the catchment area. 1.4 Gather <i>historical catchment information</i> and evaluate as input to the management process. 1.5 Identify, interpret and assess water quality and quantity requirements. 1.6 Identify and interpret <i>environmental factors</i> and other relevant <i>issues</i> that impact on the catchment area.
<b>2 Implement the catchment management plan.</b>	2.1 Inform and educate stakeholders about catchment activity regulations. 2.2 Develop management plan activities. 2.3 Develop the implementation plan. 2.4 Coordinate management plan activities.
<b>3 Monitor the catchment management plan.</b>	3.1 <i>Design</i> and implement <i>monitoring and testing programs</i> . 3.2 Analyse, interpret and record testing results. 3.3 Coordinate and manage the identification and investigation of current and/or potential problems. 3.4 Report the results of the investigation of problems and make recommendations. 3.5 Monitor the catchment area usage according to the plan. 3.6 Coordinate and manage the identification, investigation and reporting of breaches of usage provisions.
<b>4 Monitor and evaluate the catchment management plan.</b>	4.1 Review objectives of the management and implementation plans. 4.2 Make recommendations for changes to objectives and implementation procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively to a wide and diverse group of stakeholders
- interpret and apply legislation and policies
- design and manage measuring and testing activities
- analyse test results
- coordinate and oversees the conduct of investigations
- assess environmental impact
- implement management plans
- develop implementation plans that reflect management plan objectives and organisational requirements
- prepare reports and recommendations.

#### **Required knowledge:**

- relevant historical records
- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- customer expectations and requirements
- occupational health and safety and environmental legislation
- Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement and manage activities in water catchments that impact on water yield and quality to ensure performance measures for the catchment management plan are met including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and water quality test results) to underpin the sound management of the water catchment plan
- consulting widely and effectively
- developing effective implementation plans that address the objectives and requirements specified in the management plan
- developing, implementing and overseeing testing and other monitoring arrangements to track the performance of the catchment management plan
- preparing reports and recommendations for future action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Catchment management requirements*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- organisational needs
- codes of practice.

***User and customer*** may include:

- recreational users of the catchment area
- forestry and land management authorities
- housing developers and home owners
- farmers
- traditional land owners
- consumers of water
- water authorities.

***Historical catchment information*** may include:

- relevant hydrometrical information
- previous monitoring studies
- previous risk assessments
- vegetation surveys
- anecdotal information from land holders
- geological data
- hydro-geological data.

***Environmental factors*** that impact on the catchment area may include:

- flora
- fauna
- chemicals
- land degradation
- nutrients
- fire breaks
- farming practices
- land use.

***Issues*** that impact on or relate to the catchment area may include:

- existence of known cultural sites
- land use patterns
- environmental issues
- other human activity.

***Monitoring and testing***

- sampling and testing procedures

## **RANGE STATEMENT**

*programs are designed* and may include reference to:

- the testing medium
- the testing frequency
- sampling locations
- testing variables.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP513B Develop and review catchment management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to develop and review catchment management plans that impact on water yield and/or quality.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of water catchments.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.



## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for catchment management.</b>	<p>1.1 Identify and interpret <b><i>catchment management requirements</i></b>.</p> <p>1.2 Identify and evaluate <b><i>user and customer</i></b> requirements that impact on the catchment area.</p> <p>1.3 Gather <b><i>historical catchment information</i></b> and evaluate as input to the planning process.</p> <p>1.4 Identify, interpret and assess water quality and quantity requirements.</p> <p>1.5 Identify and interpret <b><i>environmental factors</i></b> and other relevant <b><i>issues</i></b> that impact on the catchment area.</p>
<b>2 Develop the catchment management plan.</b>	<p>2.1 Identify, interpret and validate <b><i>stakeholder</i></b> requirements that impact on the catchment area.</p> <p>2.2 Review and clarify organisational objectives and key performance indicators for the catchment management plan.</p> <p>2.3 Develop a catchment management plan.</p>
<b>3 Review and refine the catchment management plan.</b>	<p>3.1 Assess data from the ongoing implementation of the catchment management plan and use to inform the review of the plan.</p> <p>3.2 Review objectives of the management and implementation plans.</p> <p>3.3 Make recommendations for changes to objectives and implementation procedures.</p> <p>3.4 Provide advice and guidance to catchment area users and stakeholders.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation and policies
- interpret and use measuring and testing activities
- conduct investigations
- assess environmental impacts
- use data to inform planning process
- communicate and consult with stakeholders.

#### **Required knowledge:**

- water quality processes and parameters
- water management processes
- analysis of historical records
- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- risk management principles
- investigation procedures
- customer expectations and requirements
- occupational health and safety and environmental legislation
- Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to develop and review catchment management plans that impact on water yield and quality including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and water quality test results) to underpin the sound development of the water catchment management plan
- consulting widely and effectively
- developing effective catchment management plans that address the water organisation's objectives and requirements
- using data from testing and other monitoring arrangements to track the performance of the catchment management plan and inform the review of the plan
- preparing reports and recommendations for changes to the objectives of the management plan and its implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Catchment management requirements*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- organisational needs
- codes of practice.

***User and customer stakeholders*** may include:

- recreational users of the catchment area
- forestry and land management authorities
- housing developers and home owners
- farmers
- traditional land owners
- consumers of water
- water authorities.

***Historical catchment information*** may include:

- relevant hydrometrical information
- previous monitoring studies
- previous risk assessments
- vegetation surveys
- anecdotal information from land holders
- geological data
- hydro-geological data.

***Environmental factors*** that impact on the catchment area may include:

- flora
- fauna
- chemicals
- land degradation
- nutrients
- fire breaks
- farming practices
- land use.

***Issues*** that impact on or relate to the catchment area may include:

- existence of known cultural sites
- land use patterns
- environmental issues
- other human activity.

***Stakeholder*** groups may

- state forestry bodies

## **RANGE STATEMENT**

include:

- state parks authorities
- land care groups
- catchment management trusts and community groups
- environmental interest groups
- native title and indigenous groups
- state government
- local councils/shires
- water authorities.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP514B Implement and manage groundwater management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to implement and manage the management plan to use groundwater as a resource for water supply.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of groundwater resources.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for the management of groundwater.</b>	1.1 Confirm performance measures for the groundwater management plan.
	1.2 Identify and interpret <i>legislative requirements</i> and organisational policies for the management of groundwater.
	1.3 Identify stakeholder requirements that impact on the groundwater quality, quantity and conservation.
	1.4 Gather <i>historical groundwater information</i> and evaluate as input to the management process.
	1.5 Identify, interpret and assess water quality and quantity requirements.
	1.6 Identify and interpret <i>environmental and developmental factors</i> that impact on the groundwater.
<b>2 Implement the groundwater management plan.</b>	2.1 Inform and educate stakeholders about groundwater activity regulations.
	2.2 Develop management plan activities.
	2.3 Develop and present the implementation plan.
	2.4 Coordinate management plan activities.
<b>3 Monitor the groundwater management plan.</b>	3.1 Design and implement <i>monitoring and testing programs</i> .
	3.2 Analyse, interpret and record test results.
	3.3 Identify and investigate current and/or potential problems and report results and recommendations.
	3.4 Monitor groundwater usage and quality according to the plan.
	3.5 Identify, investigate and report breaches of usage provisions and changes to quality parameters.
<b>4 Evaluate and review the performance of the groundwater management plan.</b>	4.1 Identify, investigate and report deviations of planned groundwater usage quality and management from plan procedures.
	4.2 Make recommendations for changes to objectives and implementation procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively to a wide and diverse group of stakeholders
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- analyse test results
- oversee investigative procedures
- coordinate and oversee the conduct of investigations
- assess environmental impacts
- develop and implement groundwater management plans
- link implementation plans to the groundwater management plan objectives and organisational requirements
- prepare reports and recommendations.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- customer expectations and requirements
- groundwater analysis procedures
- groundwater hydraulics
- environmental legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement and manage the management plan to use groundwater as a resource for water supply including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and water quantity and quality test results) to underpin the implementation of the groundwater management plan
- consulting widely and effectively
- developing effective implementation plans that address the objectives and requirements specified in the management plan
- investigating and reporting breaches of groundwater usage
- developing, implementing and overseeing testing and other monitoring arrangements to track the performance of the groundwater management plan.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative requirements*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws.

***Historical groundwater information*** may include:

- relevant geological data
- hydro-geological data
- hydrometrical information
- previous monitoring studies
- previous risk assessments
- land use studies
- environment management studies.

***Environmental and development factors*** may include:

- human interaction
- absorption
- pollutants
- nutrients
- salinity
- cultural aspects
- land use
- other human activity
- vegetation
- urban growth
- industry growth.

***Monitoring and testing*** programs may include:

- resource yield
- testing procedures
- testing medium
- frequency
- quality requirements
- geophysical work
- modelling
- surveys
- water quality.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Collection and distribution

# NWP515B Develop and review groundwater management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required for the management of groundwater as a resource to be used for water supply.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the development and review of groundwater resources.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for groundwater management.</b>	<p>1.1 Identify and interpret <b><i>legislative requirements</i></b> and organisational policies for the management of groundwater.</p> <p>1.2 Identify stakeholder requirements that impact on the groundwater quality, quantity and conservation.</p> <p>1.3 Gather <b><i>historical groundwater information</i></b> and evaluate as input to the planning process.</p> <p>1.4 Identify, interpret and assess water quality and quantity requirements.</p> <p>1.5 Identify and interpret <b><i>environmental and development factors</i></b> that impact on the groundwater.</p>
<b>2 Develop the groundwater management plan.</b>	<p>2.1 Identify and interpret groundwater management requirements.</p> <p>2.2 Identify, interpret and validate stakeholder requirements that impact on groundwater.</p> <p>2.3 Develop a groundwater management plan.</p> <p>2.4 Identify, investigate and report breaches of usage provisions and changes to quality parameters.</p>
<b>3 Review and refine the groundwater management plan.</b>	<p>3.1 Assess data from the ongoing implementation and <b><i>monitoring</i></b> of the groundwater management plan and use to inform the review of the plan.</p> <p>3.2 Review objectives of the management and implementation plans.</p> <p>3.3 Make recommendations for changes to objectives and implementation procedures.</p> <p>3.4 Provide advice and guidance to groundwater users and other stakeholders.</p>



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate and consult
- interpret and apply legislation and policies
- use data to inform decision making and planning
- develop plans to meet organisational requirements and performance indicators
- conduct investigations
- assess environmental impact
- report clearly and effectively.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- customer expectations and requirements
- groundwater analysis procedures
- groundwater hydraulics
- environmental legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to manage groundwater as a resource to be used for water supply including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and water quality test results) to underpin the sound development of the groundwater management plan
- consulting widely and effectively
- developing effective groundwater management plans that address the water organisation's objectives and requirements
- using data from testing and other monitoring arrangements to track the performance of the groundwater management plan and inform the review of the plan
- preparing reports and recommendations for changes to the objectives of the management plan and its implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

number of performances assessed at different points in time and separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative requirements*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws.

***Historical groundwater information*** may include:

- relevant geological data
- hydro-geological data
- hydrometrical information
- previous monitoring studies
- previous risk assessments
- land use studies
- environment management studies.

***Environmental and development factors*** may include:

- human interaction
- adsorption
- pollutants
- nutrients
- salinity
- cultural aspects
- land use
- other human activity
- vegetation
- urban growth
- industry growth.

***Monitoring*** may include:

- resource yield
- testing procedures
- testing medium
- frequency
- quality requirements
- geophysical work
- modelling
- surveys
- water quality
- other variables.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Collection and distribution

# **NWP516B Implement and manage surface water management plan**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required for the implementation of the management plan for surface water to ensure environmental considerations are met and source of supply is maintained.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of surface water resources.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Implement and coordinate monitoring and testing program.</b>	<p>1.1 Confirm performance measures of the <b><i>surface water</i></b> management plan.</p> <p>1.2 Design and implement <b><i>monitoring and testing programs</i></b>.</p> <p>1.3 Coordinate activities relating to the surface water plan.</p> <p>1.4 Interpret and record test results and education programs.</p> <p>1.5 Identify and investigate current and/or potential problems and report results and recommendations.</p> <p>1.6 Gather <b><i>historical surface water information</i></b> and evaluate.</p> <p>1.7 Monitor <b><i>water usage, water flow and water quality</i></b> according to the plan.</p>
<b>2 Monitor and evaluate performance of surface water management plans.</b>	<p>2.1 Identify, investigate and report deviations of planned water usage and quality and management plan procedures.</p> <p>2.2 Review objectives of the management and implementation plans.</p> <p>2.3 Review parameters for water usage and quality.</p> <p>2.4 Monitor and review <b><i>environmental factors that impact on surface water</i></b>.</p> <p>2.5 Make recommendations for changes to plan objectives and procedures and usage and quality parameters.</p> <p>2.6 Provide advice and guidance to water <b><i>users and stakeholders</i></b>.</p>
<b>3 Report on monitoring and implementation activities.</b>	<p>3.1 Identify and report deviations from the management plan.</p> <p>3.2 Review and report objectives of the management and implementation plans.</p> <p>3.3 Make recommendations for changes to plan objectives.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation and policies
- coordinate measuring and testing activities
- conduct investigations
- assess environmental impacts
- communicate effectively with stakeholders and users
- make decisions based on the analysis of data
- report clearly and effectively.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- measuring and testing procedures
- investigation procedures
- risk management principles
- customer expectations and requirements
- climatic and weather characteristics and impacts
- hydraulic analysis.



## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement management plans for surface water to ensure environmental considerations are met and source of supply is maintained:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and water quantity and quality test results) to underpin the implementation of the surface water management plan
- designing and implementing testing processes and programs
- monitoring and evaluating the outcomes of the surface water management plan
- providing advice about water usage and communicate with stakeholders and users
- preparing reports and recommendations for future action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's

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competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Surface water*** sources may include:

- dams and reservoirs
- weirs and rivers
- lakes
- creeks and streams
- wetlands
- off stream storage
- catchment areas
- storage tanks.

***Monitoring and testing programs*** may include:

- resource yields
- resource status
- flow rates
- testing procedures
- testing medium
- testing frequency
- sampling locations
- testing variables
- land use changes.

***Historical surface water information*** may include:

- hydrometrical information
- previous monitoring studies
- previous risk assessments
- geological data
- hydro-geological data
- land use studies
- environmental management studies
- anecdotal information from land owners.

***Water usage, water flow and water quality*** may be influenced by a range of factors including:

- usage and environment allocations
- licenses
- legislative requirements
- enterprise policies
- cost benefit analysis.

***Environmental factors that impact on surface water***

- environmental flow requirements
- catchment usage and management

## **RANGE STATEMENT**

may include:

- weather and climate
- rainfall run-off
- chemicals
- salinity
- nutrients
- reservoir operations
- natural events.

*Users and stakeholders*

may include:

- water consumers
- government
- water authorities
- environmental departments
- recreational users of the area
- interest groups
- industry
- extractive industry.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP517B Develop and review surface water management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to develop and review a surface water management plan to ensure environmental considerations are met and source of supply is maintained.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of surface water resources.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for management of surface water flows and quality.</b>	<p>1.1 Identify and interpret <b><i>surface water</i></b> flow requirements.</p> <p>1.2 Identify and interpret <b><i>water flow, quality and quantity requirements</i></b>, including release.</p> <p>1.3 Identify and interpret <b><i>historic source water flow</i></b> and system capacity information.</p> <p>1.4 Identify and interpret environmental flows that impact on water flows and quality.</p> <p>1.5 Identify and interpret <b><i>environmental factors</i></b> that impact on surface water.</p> <p>1.6 Identify, interpret and review the current status of resource and operational protocols.</p>
<b>2 Develop the surface water management plan.</b>	<p>2.1 Identify and interpret surface water management requirements.</p> <p>2.2 Identify, interpret and validate stakeholder requirements that impact on surface water.</p> <p>2.3 Develop a <b><i>surface water management plan</i></b>.</p>
<b>3 Review the surface water management plan.</b>	<p>3.1 Analyse and report deviations from planned performance measures.</p> <p>3.2 Review objectives of the management and implementation plans.</p> <p>3.3 Review parameters for water usage and quality through <b><i>monitoring and testing programs</i></b>.</p> <p>3.4 Make recommendations for changes to plan objectives and procedures, and usage and quality parameters.</p> <p>3.5 Provide advice and guidance to water <b><i>users and stakeholders</i></b>.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation and policies
- coordinate measuring and testing activities
- conduct investigations
- assess environmental impact
- use data to inform planning process
- communicate and consult with stakeholders and users.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- measuring and testing procedures
- investigation procedures
- risk management principles
- customer expectations and requirements
- climatic and weather characteristics and impacts
- hydraulic analysis.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to develop and review a surface water management plan to ensure environmental considerations are met and source of supply is maintained including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and monitoring and test results) to underpin the sound development of the surface water management plan
- consulting widely and effectively
- developing effective surface water management plans that address the water organisation's objectives and requirements
- using data from testing and other monitoring arrangements to track the performance of the surface water management plan and inform the review of the plan
- preparing reports and recommendations for changes to the objectives of the management plan and its implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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



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experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Surface water*** sources may include:

- dams
- reservoirs
- weirs
- rivers
- lakes
- creeks and streams
- wetlands
- off stream storage
- catchment areas
- storage tanks.

***Water flow, quality and quantity requirements*** may be influenced by factors including:

- usage and environment allocations
- licenses
- legislation
- enterprise policies
- cost benefit analysis.

***Historic source water flow*** information may include:

- hydrological information
- previous monitoring studies
- previous risk assessments
- geological data
- hydro-geological data
- land use studies
- environmental management studies
- anecdotal information from land owners.

***Environmental factors*** that impact on surface water may include:

- environmental flow requirements
- catchment usage and management
- weather and climate
- rainfall run-off
- chemicals
- salinity
- nutrients
- reservoir operations
- natural events.

## RANGE STATEMENT

The development of a *surface water management plan* may include:

- setting targets and objectives for quantity
- quality
- stakeholders
- future use.

*Monitoring and testing programs* may include:

- resource yields
- resource status
- flow rates
- testing procedures
- testing medium
- testing frequency
- sampling locations
- testing variables
- land use changes.

*Users and stakeholders* may include:

- water consumers
- government
- water authorities
- environmental departments
- recreational users of the area
- interest groups
- industry
- extractive industry.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# NWP518B Prepare and report on data related to flood mitigation

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to collect and analyse data associated with rainfall, run-off, flood estimation and reporting required for the development and communication of flood mitigation plans.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for planners and managers in water organisations with responsibility for the preparation of flood mitigation reports.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Analyse rainfall and run-off regimes.</b>	<p>1.1 Access and interpret historical rainfall run-off and <b><i>flooding regimes</i></b> of specific catchments.</p> <p>1.2 Delineate historical floods.</p> <p>1.3 Model simulated, hypothetical or estimated rainfall intensity data and catchment characteristics.</p> <p>1.4 Collate, manipulate and interpret <b><i>data</i></b>.</p>
<b>2 Estimate flooding.</b>	<p>2.1 Use <b><i>techniques for flood estimation</i></b> and apply to the development of flood estimation guidelines.</p> <p>2.2 Estimate and record flood levels, extents and flow rates.</p> <p>2.3 Complete and record <b><i>flood hazard assessments</i></b>.</p> <p>2.4 Analyse and record the impact of <b><i>planning controls</i></b> of flood assessments.</p>
<b>3 Report and communicate information.</b>	<p>3.1 Collate, analyse and record information to meet organisational requirements.</p> <p>3.2 Communicate information to <b><i>stakeholders</i></b> using standard organisational procedures.</p> <p>3.3 Prepare and present reports in a clear, concise and timely manner to meet organisational requirements.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- use mathematical techniques to analyse and model flood data
- collect and interpret data
- manipulate and model data
- develop clear and effective reports
- communicate effectively.

#### **Required knowledge:**

- catchment hydrology principles
- water flow measurement
- flow routing
- relevant legislation, by-laws and planning schemes
- mathematical calculation
- cultural environment
- occupational health and safety and environmental legislation, Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to collect and analyse data associated with rainfall, run-off, flood estimation and reporting required for the development and communication of flood mitigation plans including:

- collecting relevant data
- analysing relevant data
- modelling of data
- preparing clear, concise and timely reports
- communicating data and outcomes to stakeholders and team members.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Flooding regimes*** may include:

- flood levels
- peaks; flow rates
- area extent
- duration.

***Data*** may include:

- time series data
- historical
- rainfall
- flood levels.

***Techniques for flood estimation*** may include:

- base flow separation
- flood frequency
- rainfall modelling.

***Flood hazard assessments*** may include:

- the safety of people
- safety of animals
- land inundation
- house and other property inundation
- effects on communication and other infrastructures
- ability and extent of need for emergency services industry
- cost analysis.

***Planning controls*** may include.

- land use planning
- construction or destruction of physical structures (eg levee banks, sand bag levees)
- infrastructure development
- cultural land restrictions.

***Stakeholders*** may include:

- community groups
- land holders
- emergency response groups
- town planners
- utility managers (gas, electricity, water)
- local government
- industry and commerce.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Common

## **NWP519B Develop and report flood mitigation**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to analyse and model data relating to flooding, develop effective management and warning systems and communicate the outcomes concisely and effectively.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for planners and managers in water organisations with responsibility for the preparation of flood management strategies and flood warning systems.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Analyse rainfall and run-off regimes.</b>	<p>1.1 Access and interpret historical rainfall run-off and <b><i>flooding regimes</i></b> of specific catchments.</p> <p>1.2 Delineate historical floods.</p> <p>1.3 Model simulated, hypothetical or estimated rainfall intensity data and model catchment.</p> <p>1.4 Collate, manipulate and interpret <b><i>data</i></b>.</p>
<b>2 Estimate flooding.</b>	<p>2.1 Use <b><i>techniques for flood estimation</i></b> and apply to flood estimation guidelines.</p> <p>2.2 Estimate and record flood levels, extents and flow rates.</p> <p>2.3 Undertake and record <b><i>flood hazard assessment</i></b>.</p>
<b>3 Determine management and warning systems.</b>	<p>3.1 Evaluate the roles of storage and/or retarding basins safety and flood attenuation strategies.</p> <p>3.2 Evaluate current flood classifications and impacts and formulate planning controls for flood plain or waterway management.</p> <p>3.3 Evaluate current flood warning systems.</p> <p>3.4 Recommend or develop changes to existing flood plain or waterway management controls and warning systems.</p>
<b>4 Report and communicate recommendations.</b>	<p>4.1 Prepare and present reports in a clear, concise and timely manner to meet organisational requirements.</p> <p>4.2 Communicate findings and recommendations to <b><i>stakeholders</i></b>.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- use mathematical techniques to analyse and model flood data
- prepare and plan strategically
- computer skills
- collect and interpret data
- model data
- develop clear and effective reports
- communicate effectively
- interpret data
- manipulate data
- communicate with a range of stakeholders.

#### **Required knowledge:**

- catchment hydrology principles
- water flow measurement; flow routing
- relevant legislation, by-laws and planning schemes
- mathematical calculation
- cultural environment
- occupational health and safety and environmental legislation, Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to analyse and develop flood mitigation warning systems and strategies using the effective:

- collecting relevant data
- analysing relevant data
- modelling data
- developing critical flood warning systems
- developing strategies to mitigate the impact of potential future floods
- preparing clear, concise and timely reports
- communicating data and outcomes to stakeholders and team members.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

## EVIDENCE GUIDE

experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Flooding regimes*** may include:

- flood levels
- peaks
- flow rates
- area extent
- duration.

***Data*** may include:

- time series data
- historical
- rainfall
- flood levels.

***Techniques for flood estimation*** may include:

- base flow separation
- flood frequency
- rainfall modelling.

***Flood hazard assessment*** may include:

- safety of people
- safety of animals
- land inundation
- house and other property inundation
- effects on communication and other infrastructures
- ability and extent of need for emergency services industry
- cost analysis.

***Stakeholders*** may include:

- community groups
- land holders
- emergency response groups
- town planners
- utility managers (gas, electricity, water)
- local government
- industry and commerce.

## Unit Sector(s)

Not applicable.



## Competency field

Competency field      Common

# **NWP520A Contribute to hydrometric planning and water resource management**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to provide leadership to hydrometric planning and water resource management. A detailed understanding of the processes required to collect, analyse, store and report data together with the use of this information to inform effective policy development is essential to effective performance.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for senior hydrographers and related staff.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Review and plan hydrometric data management processes.</b>	1.1 Review the hydrometric and water resource management planning and policy requirements of the organisation in consultation with senior management. 1.2 Review and analyse the <i>data</i> required to support the hydrometric planning and water resource management processes within the organisation. 1.3 Review the <i>processes to collect, analyse, store and report</i> hydrometric data to ensure they support the organisation's short, medium and long term planning needs. 1.4 Identify, plan and report resource requirements to meet the hydrometric data management needs of the organisation.
<b>2 Support the provision of quality data.</b>	2.1 Review work procedures and documentation used to support the collection, analysis, storage and reporting of hydrometric data as required and communicate to staff. 2.2 Use advanced <i>mathematical and technical processes</i> to support the planning and operation of hydrometric monitoring and testing regimes. 2.3 Determine monitoring and testing priorities. 2.4 Prepare reports in a format suitable to support decision-making and planning within the organisation.
<b>3 Contribute to the effective management of water resources.</b>	3.1 Review and analyse the role of hydrometric data in the development of water resource management policy within the organisation. 3.2 Gather, review and communicate local, national and international information and best practice policy regarding effective water resource management. 3.3 Conduct analysis of current, historic and trend data to inform the organisation's short, medium and long term water resource management planning. 3.4 Prepare clear and accurate reports in accordance with organisational procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- collect and analyse hydrometric and water resource management data/information sourced locally, nationally and internationally
- apply complex mathematical modelling and analytical tools
- interpret and prepare technical documentation regarding the collection, analysis and reporting of hydrometric data
- identify potential or actual operational problems
- undertake evidence-based short, medium and long range planning
- communicate with employees, senior management and external industry experts
- prepare complex reports
- use computer systems
- use communication systems
- give and receive instructions.

#### **Required knowledge:**

- high level hydrometric and water resource management technical and planning information
- mathematical techniques relevant to the complex analysis and planning of hydrometric data
- sampling and testing procedures
- occupational health and safety procedures
- policies and standard operating procedures
- communication systems.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to provide leadership to hydrometric planning and water resource management including:

- gathering, interpreting and applying complex documentation related to the hydrometric planning and water resource management processes of the organisation
- reviewing and refining current practices used in the collection, analysis, storage and reporting of hydrometric data
- planning and setting priorities for the management of hydrometric data collection, storage and reporting
- preparing clear and accurate reports
- contributing to the development of short, medium and long term water resource management planning within the organisation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities

Access must be provided to appropriate learning and/or assessment support when required

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Data*** required may include:
- local anecdotal 'data' (verbal metadata)
  - survey data (stream sections both cross and longitudinal)
  - GIS data
  - meteorological data
  - hydraulic analysis data
  - budgetary data
  - catchment water use data sets (actual resource use)
  - discharge measurements
  - ratings tables
  - water license entitlements data sets (potential resource use)
  - time series data (across data types).
- Processes to collect, analyse, store and report*** hydrometric data may include:
- downloading, processing, editing, validating, quality-coding and archiving time series data
  - service agreements
  - procedures for the establishment and management of ratings tables
  - data network audit tools, processes and software
  - high level use of database software, eg KISTERS modelling
  - communication of hydrometric information to clients
  - budget development and management processes
  - extending rating curves for monitoring sites
  - hydraulic analysis processes
  - physicochemical interactions analysis
  - data set extension techniques and processes
  - data set interpolation techniques and processes
  - data set creation techniques and processes (eg small ungauged catchments)
  - estimating uncertainty of measurements or estimations
  - applying statistical tests to evaluate an existing ratings table
- Mathematical and technical processes*** may include:



## **RANGE STATEMENT**

- using modelling or other processes to create synthesised data parameters based on accepted procedures or standards.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Hydrography

# **NWP525B Implement and manage asset construction and maintenance**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to implement and manage asset construction and maintenance projects. This requires the ability to conduct often complex planning of activities including the scheduling and resourcing of projects and the monitoring of the project to ensure the completion of the work in line with the organisation's requirements and to the required quality.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for senior managers with responsibility for coordinating, planning and managing construction and maintenance works.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare for asset construction.</b>	1.1 Identify and apply site investigation and construction guidelines, standards and other regulatory requirements. 1.2 Identify stakeholder requirements that impact on the construction. 1.3 Undertake <i>site inspections</i> according to organisation and stakeholder requirements. 1.4 Collate and check <i>project documentation</i> and assess for impact on work planning and management. 1.5 Identify and investigate potential hazards and safety risks and report recommendations for preventative action according to organisational requirements. 1.6 Identify and specify roles and responsibilities of all <i>stakeholders</i> .
<b>2 Plan construction operations.</b>	2.1 Identify organisational strategies for implementing construction operations. 2.2 Implement organisational Health and Safety (OHS) policy and procedures, including hazard and risk management. 2.3 Implement procedures for securing the required plant and equipment. 2.4 Determine and record labour requirements with reference to the work plan and/or contract documentation. 2.5 Evaluate, select and source materials to complete the job. 2.6 <i>Sequence and schedule work</i> to meet organisational requirements and the efficient completion of the project. 2.7 Follow procedures for the control of the project.
<b>3 Implement quality assurance measures.</b>	3.1 Monitor tasks and jobs to ensure compliance with plans in terms of time frames, quality assurance issues and organisational requirements. 3.2 Provide guidance to contractors or employees in a timely manner and according to the plan. 3.3 Monitor construction activities to ensure compliance with occupational health and safety and environmental regulations. 3.4 Monitor construction progress and maintain records according to organisational standards. 3.5 Promptly communicate changes to meet unforeseen requirements, resources reallocation or rescheduling and the extent of the change according to organisational procedures. 3.6 Confirm and certify completion of construction or installation according to enterprise procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- develop planning processes
- monitor work progress
- apply relevant legislation
- conduct investigations
- conduct site inspections
- prepare reports
- interpret design plans
- make adjustments and alterations to designs.

#### **Required knowledge:**

- enterprise contract procedures
- procedures for site inspections
- evaluation and investigation requirements
- enterprise reporting procedures and reporting requirements
- characteristics, technical capabilities and limitations of relevant materials
- material handling procedures
- relevant legislation
- planning processes
- occupational health and safety and environmental legislation, Acts and procedures legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement and manage asset construction and maintenance projects including:

- implement an asset construction or maintenance project, including the planning of the project that entails:
- identifying and securing the human resources, plant&equipment and materials to complete the work
- the scheduling and sequencing of the project
- ensuring organisational, planning and statutory obligations are met
- manage an asset construction or maintenance project, including:
- providing targeted, timely and constructive feedback to contractors or staff
- monitoring adherence to the project plan/schedule
- exercising judgement if the project plan or schedule requires revision due to unforeseen circumstances
- overseeing and ensuring quality outcomes are achieved
- reporting the outcomes.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Site inspections*** may be conducted to confirm:

- planning
- inspect preparation work
- assess compliance with specifications
- assess compliance with occupational health and safety requirements.

***Project documentation*** may include:

- design and construction plans
- specifications
- briefs
- drawings
- pricing schedules
- permits
- instruments of agreement
- acceptance of contract
- general and special conditions of contract
- operational manuals
- maintenance manuals
- as constructed drawings
- plans of other authorities
- financial plans
- project plans.

***Stakeholders*** may include:

- contractors
- Government agencies
- property owners
- utility organisations
- customers
- the general public
- asset users.

***Sequence and schedule work*** according to organisational procedures and may use tools including:

- manual planning tools
- Critical Path Method, PERT or GANTT charts
- project management or scheduling software.



## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## **NWP526A Evaluate, implement and monitor high-risk trade waste discharge approvals**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to assess and process applications for high-risk trade waste discharges from large and complex industrial organisations, monitor compliance with the trade waste approval issued and renew, amend, suspend or revoke trade waste discharge approvals as appropriate.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for trade waste officers or inspectors with a specific responsibility for managing applications and approvals for high-risk liquid trade waste discharges to wastewater collection systems from large and complex industrial organisations.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

## Employability Skills Information

**Employability Skills** The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged, will assist in identifying employability skill requirements.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *bold italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Advise customers on trade waste approval procedures</b>	<p>1.1 Comprehensively answer <i>customer</i> queries regarding applications for <i>high-risk trade waste</i> approval with reference to <i>organisational and statutory requirements</i>.</p> <p>1.2 Comprehensively answer customer queries regarding the procedures involved in processing and approving trade waste applications with reference to organisational requirements.</p> <p>1.3 Comprehensively answer customer queries regarding the procedures involved in monitoring and renewing trade waste applications with reference to organisational requirements.</p>
<b>2 Evaluate trade waste discharges for new types of industries and/or new types of industry processes</b>	<p>2.1 Identify significant pollutants generated by new types of industries, processes or sources.</p> <p>2.2 Identify, interpret and assess information about known impacts, risk assessments and control.</p> <p>2.3 Identify trade waste management processes and workplace procedures for new types of industries, processes or sources.</p> <p>2.4 Develop and check contingency plans for new types of industries or processes.</p> <p>2.5 Prepare trade waste management policies and plans for new types of industries and processes.</p>
<b>3 Assess applications for high-risk trade waste discharge approvals</b>	<p>3.1 Assess high-risk trade waste applications to establish that all necessary <i>documentation</i> has been provided.</p> <p>3.2 Assess high risk trade waste applications against concentration, mass and flow limits, discharges of prohibited substances, <i>local sewerage issues</i> and consider environmental issues.</p> <p>3.3 Assess proposed pre-treatment systems for suitability.</p> <p>3.4 Assess monitoring, control systems and procedures for suitability.</p> <p>3.5 Assess the adequacy of chemical storage, handling and spill prevention as appropriate.</p> <p>3.6 Schedule and conduct onsite inspections as required.</p>
<b>4 Implement approved trade waste discharge applications</b>	<p>4.1 Determine approval conditions on the basis of assessments and discuss with the applicant.</p> <p>4.2 Calculate estimates of charges and discuss with the customer according to established charging policies and formulae.</p> <p>4.3 Where applicable, monitor construction and</p>

## **ELEMENT**

## **PERFORMANCE CRITERIA**

commissioning activities to ensure compliance with approvals.

4.4 Determine *monitoring activities and schedules* and discuss with the customer.

4.5 Create and maintain database records, including charging parameters and monitoring schedule.

### **5 Monitor customers' trade waste treatment and disposal and review trade waste approval.**

5.1 Conduct routine monitoring of the compliance of customers' trade waste treatment and discharge according to the trade waste approval and organisational requirements.

5.2 Establish processes to identify and report non-compliances with trade waste approvals according to organisational requirements.

5.3 Identify and implement enforcement measures and processes to manage identified non-compliances.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- interpret and review hydraulic, architectural and site plans
- identify and evaluate trade waste-producing processes
- evaluate process inputs and outputs using relevant methodologies such as Mass Balance and Process Yield
- apply risk assessment and management based on AS4360
- use flow measuring or flow assessment techniques
- use appropriate wastewater sampling and preservation techniques for onsite and laboratory testing
- interpret and evaluate sample analysis data
- interpret and apply legislation and policies applicable to trade waste
- develop monitoring plans and coordinate measuring, testing and sampling activities
- plan and conduct investigations
- assess environmental impact using ISO14001 where appropriate
- assess waste treatment methods, processes plant and equipment
- negotiate and communicate
- use appropriate personal protective equipment for protection against physical, chemical and biological hazards.

#### Required knowledge:

- relevant legislation
- relevant enterprise policies for trade waste management
- water quality parameters of significance to the wastewater system
- personal protection and safety precautions for wastewater sampling, including the requirement for relevant inoculations, such as:
  - Q Fever
  - Hepatitis A and B
  - Polio
  - Tetanus
  - Diphtheria
- industrial waste treatment methods and processes for high risk industrial organisations
- hydraulics, chemistry and/or equivalent science
- basic knowledge of wastewater collection, treatment and disposal systems
- investigation procedures
- range of appropriate measuring, testing sampling procedures
- customer expectations and requirements

## **REQUIRED SKILLS AND KNOWLEDGE**

- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The candidate should:

- demonstrate consistent performance for each element across a representative range of applications
- meet the Performance Criteria associated with each element by employing the techniques, procedures, information and resources available in the workplace from those listed in the Range Statement
- demonstrate an understanding of the underpinning knowledge and the application of skills as described under Knowledge and Skills.

The candidate should demonstrate the ability to evaluate, implement and monitor high risk trade waste approvals, including:

- advising customers of the trade waste management policies and procedures in operation
- advising customers of requirements for obtaining and complying with trade waste discharge approvals
- assessing and evaluating applications for high-risk trade waste treatment and disposal
- implementing charging and monitoring procedures
- completing records and reports.

Context of and specific resources for assessment

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with



## EVIDENCE GUIDE

disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements

## EVIDENCE GUIDE

of the competency and the work being performed.

### Method of assessment

The following assessment methods are suggested:

- assessment in the workplace or in a simulated workplace and under the normal range of workplace conditions
- assessment should also be conducted in conjunction with aspects of technical competencies that are consistent with the work environment
- techniques for gathering evidence of competency may include:
  - observation of performance
  - written and/or oral questioning to assess knowledge and understanding
  - completion of workplace documents and reports produced as part of routine work activities
  - third party reports from experienced practitioners
  - completion of performance feedback from supervisors and colleagues.

## Range Statement

### 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. Add any 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.

*Customers* may include:

- new or existing wholesale commercial organisations
- new or existing large and complex manufacturing and industrial organisations.
- new or existing large community facilities such as hospitals and educational institutions.

*High risk trade waste* may include:

- the liquid waste generated by any business or industry which involves one or more of the following characteristics:
- high discharge rates
- large discharge volumes
- high contaminant concentrations
- large contaminant loads
- contaminants of OHS concern
- contaminants of environmental/ecological concern
- trade waste does not include domestic wastewater.

*Organisational and statutory requirements* may include:

relevant legislation, for example:

- commonwealth environmental legislation
- state water legislation
- state environmental legislation
- local by-laws
- International Standards, for example:
- ISO 14000 standards
- Australia/New Zealand Standards, for example:
- National Plumbing and Drainage Code ASNZS3500
- relevant industry codes of practice for the management of trade waste, for

## RANGE STATEMENT

example:

- industry Code of Practice for the Photographic Industry (PURE)
- National Health and Medical Research Council's (NHMRC) National guidelines for waste management in the health care industry, 1999
- state plumbing and drainage code of practice
- requirements of regulatory authorities, such as:
  - Water Authorities
  - Workcover
  - EPA
  - Health Department
  - local councils.

*Documentation* may include:

- identification of all waste producing processes
- detailed process information including all inputs and outputs
- water balance
- site hydraulic plan
- site plan
- equipment specification and process information for the proposed pre-treatment facility
- proposed flow measurement and other monitoring facilities
- proposed monitoring plan
- relevant environmental impact assessments
- proposed chemical and waste management contingency plans
- proposed effluent improvement plan
- stormwater drainage plan.

*Local sewerage issues* may include:

- impact of proposed wastewater quantity and quality on the environment including odour management
- effluent management, re-use and disposal
- biosolids management, re-use and disposal

## **RANGE STATEMENT**

***Monitoring activities and schedules*** may include:

- impact on health and safety of water utility employees
- impact of proposed wastewater quantity and quality on the sewerage infrastructure
- impact of proposed wastewater quantity and quality on the sewage treatment processes
- inspections of trade waste sites, processes and treatment facilities
- meter reading and discharge volume recording
- maintenance and calibration schedules and reporting
- sampling and testing locations, techniques and frequencies
- customer self monitoring programs and reporting
- on-line monitoring and/or alarms
- record keeping and reporting.

## **Unit Sector(s)**

Not applicable.

## **NWP527B Conduct commissioning and post commissioning activities**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to plan and manage the commissioning and post-commissioning activities associated with asset construction.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for construction and other managers responsible for the commissioning of new assets and their management post-commissioning.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan for commissioning activities.</b>	<p>1.1 Access and interpret organisational and/or contractual requirements and <b><i>documentation</i></b> for the post-construction commissioning of assets.</p> <p>1.2 Develop a specified acceptance program according to organisational requirements.</p> <p>1.3 As required, secure authorisation of the commissioning process from appropriate personnel.</p> <p>1.4 Negotiate and communicate commissioning activities, process and schedule with relevant <b><i>stakeholders</i></b>.</p>
<b>2 Conduct commissioning activities.</b>	<p>2.1 Schedule and conduct the defined commissioning program.</p> <p>2.2 Conduct <b><i>site inspections</i></b> according to commissioning requirements.</p> <p>2.3 Undertake a review of the <b><i>construction or installation planning</i></b>.</p>
<b>3 Conduct post-commissioning activities.</b>	<p>3.1 Monitor and record asset performance according to organisational standards.</p> <p>3.2 Identify defects and make arrangements to rectify them in accordance with standard organisational procedures and/or contract requirements.</p> <p>3.3 Record required operational or maintenance schedules.</p> <p>3.4 Finalise the asset register/list according to organisational standards.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan and schedule activities effectively
- develop planning processes
- interpret design plans
- interpret job specifications
- interpret contractual specifications
- monitor work progress
- apply relevant legislation
- conduct investigations
- conduct site inspections
- prepare reports
- make adjustments and alterations to designs.

#### **Required knowledge:**

- organisational contract procedures
- site inspection procedures
- investigation procedures
- evaluation and investigation requirements
- enterprise reporting procedures and reporting requirements
- characteristics, technical capabilities and limitations of relevant materials
- material handling procedures
- relevant legislation
- occupational health and safety and environmental legislation, Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to plan and manage the commissioning and post-commissioning activities associated with asset construction including:

- interpreting complex documentation (contracts, plans, specifications, etc) in order to prepare a commissioning plan and schedule
- developing an effective commissioning plan and schedule
- undertaking inspections and other commissioning activities to meet organisational requirements and reflect the specifications of the job
- undertaking post commissioning activities to organisational standard
- managing the processes for addressing defects
- reporting outcomes effectively and to organisational standard.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Documentation*** may include:

- specifications
- briefs
- drawings
- pricing schedules
- permits
- instruments of agreement
- acceptance
- general and special conditions of contract
- operational manuals
- maintenance manuals
- as constructed drawings
- plans of other authorities
- financial plans
- project plans.

***Stakeholders*** may include:

- contractors
- government
- property owners
- utility organisations
- customers
- general public
- asset users.

***Site inspections*** may be conducted to confirm:

- planning
- inspect preparation work
- assess compliance with specifications
- assess compliance with occupational health and safety requirements.

***Construction or installation planning*** may include:

- specifications
- schedules
- phasing and programming
- services and facilities.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Asset management

# **NWP528B Implement and manage trade waste policies and plans**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required for implementation and management of activities relating to trade waste management systems.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers of trade waste.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Implement trade waste policies and plans.</b>	1.1 Confirm performance measures for <i>trade waste management plans</i> .
	1.2 Identify and communicate relevant <i>environmental factors</i> , regulations, policies and criteria for the disposal of <i>trade waste</i> to waste generators and stakeholders.
	1.3 Identify and interpret trade waste quality and quantity requirements according to legislative and enterprise requirements and procedures.
	1.4 Operate the management system according to policies and management plans.
	1.5 Carry out the management system maintenance according to the management plans.
	1.6 Manage the system and enterprise to achieve the objectives of the management plans.
<b>2 Implement and coordinate the monitoring and testing program.</b>	2.1 Design and implement the <i>monitoring and testing programs</i> and procedures according to the objectives of the management plans, policies and legal requirements.
	2.2 Analyse, interpret and report testing results according to legislative and enterprise requirements.
	2.3 Identify and investigate issues and/or potential issues and trends and report results and recommendations according to legislative and enterprise requirements.
<b>3 Monitor treatment and discharge and provide advice and guidance.</b>	3.1 Monitor trade waste <i>treatment and discharge</i> according to the trade waste management policies and plans.
	3.2 Provide advice and guidance to trade waste generators and <i>stakeholders</i> according to legislative and enterprise requirements.
	3.3 Identify and investigate breaches of trade waste discharge provisions and report the results and/or recommendations according to legislative and enterprise requirements.
<b>4 Maintain trade waste records.</b>	4.1 Accurately and legibly complete trade waste management records according to legislative and enterprise requirements.
	4.2 Store trade waste records for access and review according to legislative and enterprise requirements.
	4.3 Regularly review and assess trade waste records to identify long term trends and impacts.
	4.4 Report results of record reviews according to the policy and plan requirements.
<b>5 Gather and prepare</b>	5.1 Carry out the testing, sampling and collection of physical evidence of breaches according to legal requirements.

**ELEMENT**

**evidence in relation to breaches of statutory regulations.**

**PERFORMANCE CRITERIA**

- 5.2 Record data according to legal requirements.
- 5.3 Provide witness statements according to legal requirements.
- 5.4 Collect, collate and present evidence to the legal department of the organisation for prosecution of waste generators.



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and review hydraulic, architectural and site plans
- identify and evaluate trade waste-producing processes
- evaluate process inputs and outputs using relevant methodologies such as Mass Balance and Process Yield
- interpret and evaluate sample analysis data
- interpret and apply legislation and policies applicable to trade waste
- develop monitoring plans and coordinate measuring, testing and sampling activities
- apply risk assessment and management based on AS 4360
- plan and conduct investigations
- assess environmental impacts using ISO 14001 where appropriate
- assess waste treatment methods, processes, plant and equipment
- negotiate and communicate
- manage trade waste resources
- use appropriate personal protective equipment for protection against physical, chemical and biological hazards.

#### **Required knowledge:**

- relevant legislation
- capacity and operation of plant and equipment
- relevant enterprise policies for trade waste management
- water quality parameters of significance to the wastewater system
- appropriate analytical techniques available
- industrial waste treatment methods and procedures
- hydraulics, chemistry and/or equivalent science
- investigation procedures
- range of appropriate measuring, testing and sampling procedures
- customer expectations and requirements
- occupational health and safety legislation
- personal protection and safety precautions for wastewater sampling, including the requirements for relevant inoculations, such as:
  - Q Fever
  - Hepatitis A&B
  - Polio
  - Tetanus
  - Diphtheria.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement, monitor and review a trade waste management plan including:

- interpreting and applying complex requirements (legislation, organisational policy, testing procedures, key performance indicators)
- designing monitoring programs
- implementing monitoring programs
- monitoring trade waste treatment and disposal programs
- gathering data and preparing reports of the implementation of the trade waste management plan
- managing the effective and efficient storage and maintenance of records
- investigating breaches and providing input to the legal processes that flow from successful investigations of breaches.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Trade waste management plans*** may include:
- industrial waste generation, handling, treatment and disposal guides
  - enterprise policies, procedures and administrative framework procedures
  - information on applicable trade waste laws or other requirements
  - complaint records
  - training records
  - process information
  - process operational logbooks
  - inspection, maintenance and calibration records
  - relevant contractor and supplier information
  - incident reports
  - information on emergency preparedness and response
  - records of significant trade waste impacts
  - audit results
  - management reviews
  - trade waste charging policy
  - industrial trade waste generators' register.
- Environmental factors*** may include:
- disposal options
  - sensitivity of the receiving environment
  - persistency and toxicity of the substances
  - hydraulic loads
  - temperature
  - receiving treatment plant capacity.
- Trade waste*** may include:
- the liquid waste generated by any:
  - industry
  - business
  - manufacturing processes
  - commercial operations
  - trade waste does not include domestic wastewater.
- Monitoring and testing programs*** may include:
- inspections of trade waste sites, processes and treatment facilities

## RANGE STATEMENT

- meter reading and discharge volume recording
  - maintenance schedules and reporting
  - customer self monitoring programs and reporting
  - sampling and testing locations, techniques and frequencies
  - on-line monitoring and/or alarms
  - record keeping and reporting.
- Treatment and discharge* may include:
- on-site storage and discharge
  - on-site storage and off-site discharge
  - on-site storage and off-site treatment and discharge
  - recycle and reuse options
  - on-site treatment and discharge.
- Stakeholders* may include:
- the enterprise
  - government (all levels)
  - industry (eg extractive, manufacturing)
  - community action groups
  - conservation groups
  - lobby groups
  - land care groups.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Trade waste

# NWP529B Develop and modify trade waste policies and plans

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to develop and modify policies and plans for trade waste activities relating to liquid waste discharge to wastewater collection systems.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of trade waste policies and plans.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Prepare and plan for trade waste management.</b>	1.1 Identify and define relevant provisions of <i>trade waste</i> management <i>legislation</i> , standards and enterprise policies. 1.2 <i>Document</i> trade waste management policies, procedures and programs. 1.3 Identify significant wastewater quality parameters generated by major industries. 1.4 Consider information about known impacts, risk assessments and control procedures in preparing plans. 1.5 Define and explain responsibilities and accountabilities.
<b>2 Develop or modify trade waste management policies and plans.</b>	2.1 Conduct community, enterprise and <i>stakeholder</i> consultation. 2.2 Address issues raised through consultation and incorporate them into the policy development, where appropriate. 2.3 Identify and explain trade waste management processes including <i>treatment and disposal</i> processes together with the required workplace procedures and relevant <i>environmental factors</i> . 2.4 Develop and modify contingency plans for major trade waste industries. 2.5 Include issues identified by reviews and audits into the management plan. 2.6 Prepare and present management policies and plans.
<b>3 Review and refine trade waste management policies and plans.</b>	3.1 Review management policies against established objectives, policies and plans. 3.2 Review policies and plans through consultation, against prevailing stakeholder expectations. 3.3 Modify policies and plans to include identified and required changes. 3.4 Benchmark policies, management systems and plans with other water utilities. 3.5 Modify and implement policies and plans.



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation and policies applicable to trade waste
- identify and evaluate trade waste-producing processes
- apply risk assessment and management based on AS 4360
- interpret and evaluate sample analysis data
- plan and conduct investigations
- develop monitoring plans and coordinate measuring, testing and sampling activities
- assess environmental impact using ISO 14001 where appropriate
- assess waste treatment methods, processes plant and equipment
- negotiate and communicate
- consult and communicate with external and internal groups
- develop contingency plans
- prepare reports and manage records
- use mathematical and scientific techniques to interpret test results.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies for trade waste management
- enterprise consultation processes
- control procedures
- risk assessment processes and procedures
- enterprise emergency response requirements
- trade waste management systems and records
- water quality parameters of significance to the wastewater system
- trade waste treatment and process technology
- wastewater collection, treatment, re-use and disposal systems
- personal protection and safety precautions for wastewater sampling including the requirements for relevant inoculations such as:
  - Q Fever
  - Hepatitis A&B
  - Polio
  - Tetanus
  - Diphtheria
- hydraulics, chemistry and equivalent science.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to develop and modify policies and plans for trade waste activities relating to liquid waste discharge to wastewater collection systems including:

- gathering, interpreting and synthesising information (including current legislation and standards, stakeholder views and testing & monitoring results) to underpin the sound development and modification of trade waste policies and plans
- consulting widely and effectively
- developing and modifying effective trade waste policies and plans that address the water organisation's objectives and requirements
- using data from monitoring arrangements to track the performance of the trade waste system and inform the review of the policies and plans
- preparing reports and recommendations for changes to the objectives of the policies and plans and their implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

number of performances assessed at different points in time and separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Trade waste*** covers:

- the liquid or solid waste disposed of and to the wastewater collection system by industry
- business and trade manufacturing processes
- commercial operations
- chemical manufacturers
- rural industries
- utilities and services (eg health)
- farming operations
- pre-treatment plants and waste storage
- trade waste does not include domestic wastewater.

***Legislation*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- relevant government and quasi government policies and regulations
- relevant community planning and development agreements (eg local government planning consent)
- water authority regulations and by-laws
- World Health Organisation guidelines
- Environment Protection Authority guidelines.

***Document*** may include:

- information on applicable trade waste laws or other requirements
- complaint records
- training records
- process information
- process operational logbooks
- inspection, maintenance and calibration records
- relevant contractor and supplier information
- incident reports
- information on emergency preparedness and response
- records of significant trade waste impacts
- audit results
- management reviews

## RANGE STATEMENT

- Stakeholder* groups may include:
- trade waste charging policy
  - industrial trade waste generators' register.
  - the enterprise
  - government (all levels)
  - industry (eg extractive, manufacturing)
  - community action groups
  - conservation groups
  - lobby groups
  - land care groups
  - the general community and individuals.
- Treatment and discharge* may include:
- on-site storage and disposal and/or treatment
  - off-site disposal
  - dilution
  - specifying and controlling discharge rates
  - recycle and reuse options
  - on-site pre-treatment.
- Environmental factors* may include:
- disposal options
  - sensitivity of the receiving environment
  - persistency and toxicity of the substances
  - hydraulic loads
  - temperature of wastes
  - receiving treatment plant capacity
  - organic loads
  - concentration of components in wastes
  - climatic variation.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Trade waste

## **NWP530B Implement and manage the operation and maintenance of irrigation delivery systems**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to cover the activities associated with the implementation and management of the operation and maintenance of irrigation delivery systems, including system performance analysis, customer liaison and planning.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the implementation of irrigation system management plans.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Implement the irrigation system management plan.</b>	<p>1.1 Confirm performance measures for the <i>irrigation system management plan</i>.</p> <p>1.2 Access and interpret <i>historic system information</i> to inform the implementation process.</p> <p>1.3 Inform and educate <i>stakeholders</i> about the system management plan.</p> <p>1.4 Develop management plan components and activities for implementation.</p> <p>1.5 Develop the implementation plan in conformance with <i>legislation</i>, organisational and <i>environmental requirements</i>.</p> <p>1.6 Determine responsibilities and timelines for the implementation activities.</p>
<b>2 Monitor and evaluate the operation and maintenance of the irrigation system.</b>	<p>2.1 Plan, perform and report on <i>monitoring and testing</i> procedures to identify deviations of planned water system quantity, quality, release and flow rates.</p> <p>2.2 Evaluate delivery of water to customers (timeliness, volume and flow rates) and identify, investigate and report deviations from agreed service.</p> <p>2.3 Evaluate maintenance budgets, activity programs and output target measures and identify, investigate and report deviations from targets.</p> <p>2.4 Identify and document links between operational problems and maintenance activities.</p>
<b>3 Report on the implementation of the irrigation system management plan.</b>	<p>3.1 Identify, investigate and report deviations of planned water usage, quality and management plan procedures.</p> <p>3.2 Review objectives of the management and implementation plans.</p> <p>3.3 Make recommendations for changes to plan objectives and operational and maintenance procedures.</p>



## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation
- interpret and apply organisational policies
- use mathematical techniques to interpret data
- coordinate measuring and testing activities
- conduct investigations
- assess environmental impacts.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- operations and maintenance policies and procedures
- occupational health and safety and environmental legislation, Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to cover the activities associated with the implementation and management of the operation and maintenance of irrigation delivery systems including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and the results of irrigation system testing and monitoring) to underpin the implementation of the irrigation management plan
- planning and implementing testing processes and programs
- monitoring and evaluating the outcomes of the irrigation system management plan
- providing advice and communicating with stakeholders and users
- preparing reports and recommendations for future action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

The ***irrigation system management plan*** may include:

- service levels
- capital investment
- maintenance levels.

***Historic system information*** may include:

- previous studies
- impact of weather
- relevant hydrometric information
- previous system deliveries
- previous flow rates and operational procedures.

***Stakeholders*** may include:

- customers
- government
- farmer and grower associations
- downstream land holders
- other water authorities
- employees
- customer representative committees
- land care or similar active groups
- local communities.

***Legislation*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws or planning instruments
- board or authority by-laws.

***Environmental requirements*** may include:

- environmental flows
- chemicals
- nutrients
- salinity
- downstream requirements.

***Monitoring and testing*** may include:

- timeliness of deliveries
- flow
- input and output quality
- testing procedures
- frequency

## **RANGE STATEMENT**

- sampling locations
- budgets
- physical achievement targets
- operational procedures
- number of complaints.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

# NWP531B Develop and review irrigation system management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the activities associated with the development and review of the operation and maintenance of irrigation systems, including system performance analysis, customer liaison and planning.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of the irrigation system.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for management of the irrigation system.</b>	<p>1.1 Determine and interpret water quantity and quality requirements including release and flow rates.</p> <p>1.2 Access and interpret <b>historic system capacity information</b>.</p> <p>1.3 Identify and access <b>legislative</b>, organisational and <b>environmental requirements</b> and system constraints that impact on the delivery of irrigation water.</p>
<b>2 Develop an irrigation system management plan.</b>	<p>2.1 Identify and interpret irrigation system management requirements.</p> <p>2.2 Identify and validate customer requirements for irrigated culture.</p> <p>2.3 Consult <b>stakeholders</b>, or their representatives, and obtain input for the management plan.</p> <p>2.4 Develop and record an <b>irrigation system management plan</b>.</p>
<b>3 Review and refine the irrigation system management plan.</b>	<p>3.1 <b>Monitor</b> outcomes of the operations and maintenance evaluations and incorporate into the system's management review.</p> <p>3.2 Review objectives of the management and implementation plans.</p> <p>3.3 Make recommendations for changes to plan objectives and operational and maintenance procedures.</p> <p>3.4 Provide advice and guidance to stakeholders.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret and apply legislation and policies
- coordinate measuring and testing activities
- conduct investigations
- use data to inform planning processes
- communicate and consult with stakeholders and users
- assess environmental impacts.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- operations and maintenance policies and procedures
- occupational health and safety and environmental legislation, Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to develop and review of the operation and maintenance of irrigation systems including:

- gathering, interpreting and synthesising information (including historical system capacity data, current legislation and standards, stakeholder views and monitoring results) to underpin the sound development of the irrigation system management plan
- consulting widely and effectively
- developing effective irrigation system management plans that address the water organisation's objectives and requirements
- using data from monitoring arrangements to track the performance of the irrigation system management plan and inform the review of the plan
- preparing reports and recommendations for changes to the objectives of the management plan and its implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Historic system capacity information*** may include:

- previous studies
- impact of weather
- relevant hydrometric information
- previous system deliveries
- previous flow rates and operational procedures.

***Legislative requirements*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws or planning instruments
- board or authority by-laws.

***Environmental requirements*** may include:

- environmental flows
- chemicals
- nutrients; salinity
- downstream requirements.

***Stakeholders*** may include:

- customers
- government
- farmer and grower associations
- downstream land holders
- other water authorities
- employees
- customer representative committees
- land care or similar active groups
- local communities.

An ***irrigation system management plan*** may include:

- service levels
- capital investment
- maintenance levels.

***Monitor*** outcomes using a range of indicators that may include:

- timeliness of deliveries
- flow
- input and output quality
- testing procedures
- frequency
- sampling locations

## **RANGE STATEMENT**

- budgets
- physical achievement targets
- operational procedures
- number of complaints.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Water systems

# NWP532B Implement and manage potable water system management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes for the activities associated with the implementation and management of potable water distribution systems, including system performance analysis, customer liaison and planning.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the implementation of potable water system management plans.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Implement the potable water system management plan.</b>	<p>1.1 Confirm performance measures for the potable water system management plan.</p> <p>1.2 Access and interpret <b><i>historic system information</i></b> to inform the implementation process.</p> <p>1.3 Inform and educate <b><i>stakeholders</i></b> about the system management plan.</p> <p>1.4 Develop management plan components and activities for implementation.</p> <p>1.5 Develop the implementation plan in conformance with <b><i>legislation</i></b>, organisational and <b><i>environmental requirements</i></b>.</p> <p>1.6 Determine responsibilities and timelines for the implementation activities.</p>
<b>2 Monitor and evaluate the operation and maintenance of the system.</b>	<p>2.1 Plan, perform and report <b><i>monitoring and testing</i></b> procedures to identify deviations of planned water system quantity, quality and pressure.</p> <p>2.2 Evaluate delivery of water to customers (volume and pressure) and identify, investigate and report deviations from agreed service levels.</p> <p>2.3 Evaluate maintenance budgets, activity programs and output target measures and identify, investigate and report deviations from target.</p> <p>2.4 Identify and record links between operational problems and maintenance activities.</p>
<b>3 Report on implementation of the plan.</b>	<p>3.1 Review objectives of the management and implementation plans.</p> <p>3.2 Make recommendations for changes to plan objectives and operational and maintenance procedures.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- assess environmental impacts
- coordinate operation and maintenance activities.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- customer expectations and requirements
- operations and maintenance policies and procedures
- occupational health and safety and environmental legislation, Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implementation and management of potable water distribution systems including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and the results of potable water system testing and monitoring) to underpin the implementation of the potable water management plan
- planning and implementing testing processes and programs
- monitoring and evaluating the outcomes of the potable water system management plan
- providing advice and communicating with stakeholders and users
- preparing reports and recommendations for future action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's



## EVIDENCE GUIDE

competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Historic system information*** may include:
- metering records
  - previous studies, including previous risk assessments
  - impact of weather
  - relevant hydrometrical information
  - previous system performance
  - previous flow rates and operational procedures.
- Stakeholders*** may include:
- customers
  - government
  - industries
  - other water authorities
  - power utilities
  - employees
  - customer representative committees.
- Legislation*** may include:
- relevant federal legislation
  - relevant state or territory legislation
  - relevant local government by-laws
  - Australian Standards.
- Environmental requirements*** may include:
- risk assessment
  - noise
  - odours and taste
  - chemicals
  - treatment
  - flush water disposal.
- Monitoring and testing*** may include:
- pressure
  - flow
  - input and output quality
  - testing procedures for water quality and other relevant factors
  - frequency
  - sampling locations
  - budgets
  - physical achievement targets
  - operational procedures

## **RANGE STATEMENT**

- number of complaints
- burst mains
- leakages
- World Health Organisation standards
- National Health and Medical Research Council (NHMRC) standards
- response time
- customer satisfaction.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Water systems

# NWP533B Develop and review potable water system management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to develop and review of the potable water distribution system management plan, including system performance analysis, customer liaison and planning and maintenance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of the potable water management system.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for management of the potable water system.</b>	<p>1.1 Determine and interpret water quantity and quality requirements, including pressure and flow rates.</p> <p>1.2 Access and interpret <b>historic system information</b>.</p> <p>1.3 Identify and access <b>legislative</b>, organisational and <b>environmental requirements</b> and system constraints that impact on the delivery of potable water.</p>
<b>2 Develop a potable water system management plan.</b>	<p>2.1 Identify and interpret potable water system management requirements.</p> <p>2.2 Identify and validate customer requirements for water volumes and quality.</p> <p>2.3 Consult <b>stakeholders</b>, or their representatives and obtain input for the management plan.</p> <p>2.4 Develop and record a plan for managing a potable water distribution system.</p>
<b>3 Review and refine the system management plan.</b>	<p>3.1 <b>Monitor</b> outcomes of the operations and maintenance evaluations and incorporate into the system's management review.</p> <p>3.2 Review objectives of the management and implementation plans.</p> <p>3.3 Make recommendations for changes to plan objectives and operational and maintenance procedures.</p> <p>3.4 Provide advice and guidance to stakeholders.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- assess environmental impacts
- use data to inform planning processes
- coordinate operations and maintenance activities.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- customer expectations and requirements
- operations and maintenance policies and procedures
- occupational health and safety and environmental legislation, Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to develop and review of the potable water distribution system management plan including:

- gathering, interpreting and synthesising information (including historical system data, current legislation and standards, stakeholder views and monitoring results) to underpin the sound development of the potable water system management plan
- consulting widely and effectively
- developing effective potable water system management plans that address the water organisation's objectives and requirements
- using data from monitoring arrangements to track the performance of the potable water system management plan and inform the review of the plan
- preparing reports and recommendations for changes to the objectives of the management plan and its implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

#### ***Historic system***

***information*** may include:

- metering records
- previous studies, including previous risk assessments
- impact of weather
- relevant hydrological information
- previous system performance
- previous flow rates and operational procedures.

***Legislative*** requirements may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- Australian Standards.

#### ***Environmental***

***requirements*** may include:

- risk assessment
- noise
- odours and taste
- chemicals
- treatment
- flush water disposal.

***Stakeholders*** may include:

- customers
- government
- industries
- other water authorities
- power utilities
- employees
- customer representative committees.

Outcomes are ***monitored*** using a range of indicators that may include:

- pressure
- flow
- input and output quality
- testing procedures
- frequency
- sampling locations
- budgets
- physical achievement targets
- operational procedures

## **RANGE STATEMENT**

- number of complaints
- burst mains
- leakages
- World Health Organisation standards
- National Health and Medical Research Council (NHMRC) standards
- response time
- customer satisfaction.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Water systems

# NWP534B Implement and manage drainage system management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes to implement and manage drainage systems, including system performance analysis, customer liaison and planning.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the implementation of drainage system management plans.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Implement the drainage system management plan.</b>	<p>1.1 Confirm performance measures for the <b><i>drainage system</i></b> management plan.</p> <p>1.2 Access and interpret <b><i>historic system information</i></b> to inform the implementation process.</p> <p>1.3 Inform and educate <b><i>stakeholders</i></b> about the drainage system management plan.</p> <p>1.4 Develop management plan components and activities for implementation.</p> <p>1.5 Develop the implementation plan in conformance with <b><i>legislative</i></b> and organisational requirements.</p> <p>1.6 Determine responsibilities and timelines for the implementation activities.</p>
<b>2 Monitor and evaluate the operation and maintenance of the system.</b>	<p>2.1 Plan, perform and report <b><i>monitoring and testing</i></b> procedures to identify deviations of the system's performance from requirements and agreed service levels.</p> <p>2.2 Evaluate maintenance budgets, activity programs and output target measures and identify, investigate and report deviations from targets.</p> <p>2.3 Identify and record links between operational problems and maintenance activities.</p>
<b>3 Report on implementation of the plan.</b>	<p>3.1 Review objectives of the management and implementation plans.</p> <p>3.2 Make recommendations for changes to plan objectives and operational and maintenance procedures.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- assess environmental impacts
- coordinate operations and maintenance activities.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- operations and maintenance policies and procedures
- occupational health and safety and environmental legislation, Acts 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement and manage drainage system management plans including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and the results of drainage system testing and monitoring) to underpin the implementation of the drainage system management plan
- planning and implementing testing processes and programs
- monitoring and evaluating the outcomes of the drainage system management plan
- providing advice and communicate with stakeholders and users
- preparing reports and recommendations for future action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts

## EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

The ***drainage system*** may include:

- pipe and pumping systems
- open drains
- natural water courses
- gross pollution traps
- wetland treatment systems
- stormwater outfalls
- surface water run-off
- stormwater attenuation structures.

***Historic system information*** may include:

- metering records
- previous studies
- impact of weather
- relevant hydrological information
- previous system performance
- previous flow rates and operational procedures.

***Stakeholders*** may include:

- customers
- government
- industries
- other water authorities
- power utilities
- employees
- customer representative committees.

***Legislative requirements*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- Australian Standards.

***Monitoring and testing*** may include:

- flow
- input and output quality
- testing procedures
- physical analysis of water
- fauna and flora surveys
- sampling locations
- budgets



## **RANGE STATEMENT**

- physical achievement targets
- operational procedures
- number of complaints
- World Health Organisation standards
- response time
- customer satisfaction.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Water systems

# NWP535B Develop and review drainage system management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to develop and review the management plan for the operation and maintenance of drainage systems.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of the drainage management system.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for the development of a drainage management plan.</b>	1.1 Identify and interpret <i>drainage collection, transport, treatment and disposal system</i> requirements, including legislative and enterprise policies. 1.2 Access and interpret <i>historic drainage system information</i> relevant to the management process. 1.3 Identify issues that impact on the collection, transport, treatment and disposal of drainage. 1.4 Identify <i>stakeholder</i> and customer requirements that impact on the drainage system. 1.5 Identify and quantify <i>legislative</i> , organisational and environmental requirements that impact on the drainage system.
<b>2 Develop a drainage management plan.</b>	2.1 Determine and apply drainage performance requirements according to legislative and enterprise requirements. 2.2 Include <i>information</i> that impacts on the planning process according to enterprise procedures. 2.3 Identify, quantify and define available resources. 2.4 Prepare and present the drainage management plan.
<b>3 Review and refine drainage management policies and plans.</b>	3.1 Review management policies against established objectives. 3.2 Review management plans against established management policies and plans. 3.3 Review policies and plans, through consultation, against prevailing stakeholder expectations. 3.4 Modify policies and plans to include identified and required changes. 3.5 Implement modified policies and plans.
<b>4 Review and refine the drainage management plan.</b>	4.1 Identify deviations in the drainage management plan. 4.2 Identify and evaluate system changes to meet the requirements of the drainage management plan. 4.3 Identify and evaluate changes to the drainage management plan, required due to different legislative, enterprise, community, user or stakeholder requirements. 4.4 Report and recommend changes to the drainage management plan according to legislative and organisational requirements. 4.5 Include accepted recommendations into the updated and modified drainage management plan. 4.6 Implement changes to the drainage management plan.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and enterprise policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- interpret and apply environmental legislation
- apply consultation and communication skills
- assess environmental impacts.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- enterprise financial systems and key performance indicators
- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to develop and review the management plan for the operation and maintenance of drainage systems including:

- gathering, interpreting and synthesising information (including historical system data, current legislation and standards, stakeholder views and monitoring results) to underpin the sound development of the drainage system management plan
- consulting widely and effectively
- developing effective drainage system management plans that address the water organisation's objectives and requirements
- using data from monitoring arrangements to track the performance of the drainage system management plan and inform the review of the plan
- preparing reports and recommendations for changes to the objectives of the management plan and its implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

The ***drainage collection, transport, treatment and disposal system*** may include:

- pipe and pumping systems
- open drains and natural water courses
- gross pollution traps
- wetland treatment systems
- stormwater outfalls
- surface water run-off:
- roads
- pavements
- roofs
- parks
- stormwater flow attenuation structures.

***Historic drainage system information*** may include:

- previous studies
- impact of weather
- relevant hydrological information
- system models.

***Stakeholder*** may include:

- conservation groups
- land care groups
- general community
- farming groups and individuals
- mining groups and companies
- catchment users
- government (all levels)
- quasi government organisations.

***Legislative*** requirements may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- relevant land care group agreements
- relevant government and quasi government authorities' rules (eg Great Barrier Reef Marine Park Authority, Environment Protection Authority).

***Information*** gathered by monitoring and testing may include:

- physical analysis of water:
- pH
- conductivity
- colour



## **RANGE STATEMENT**

- turbidity
- chemical analysis of water:
- chlorine
- alkalinity
- biochemical oxygen demand
- heavy metals
- iron
- manganese
- microbiological analyses:
- coliforms
- plate counts
- algae identification and counts
- physical measures:
- power
- chemicals
- water flows
- sludge volumes
- mechanical testing:
- vibration
- noise
- temperature
- fauna and flora surveys
- stakeholder surveys.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Water systems

## **NWP536B Implement and manage wastewater collection management plan**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to implement and manage the plans for wastewater collection networks and systems.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the implementation of wastewater collection management plans

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Implement the wastewater collection management plan.</b>	1.1 Confirm performance measures for the <i>wastewater</i> management plan. 1.2 Access and interpret <i>historic system information</i> to inform the implementation process. 1.3 Design and implement monitoring and testing programs according to the objectives of the wastewater collection management plan. 1.4 Operate the system according to the wastewater collection management plan and <i>legislative requirements</i> . 1.5 Plan and oversee system maintenance according to the wastewater collection management plan. 1.6 Manage the organisation resources to achieve the objectives of the wastewater collection management plan.
<b>2 Monitor and evaluate the operation and maintenance of the wastewater collection management plan.</b>	2.1 Monitor and test system performance according to management plan. 2.2 Analyse and interpret <i>monitoring and testing</i> results and report according to legislative and enterprise requirements. 2.3 Investigate current and/or potential problems identified and report results and recommendations according to legislative and enterprise requirements. 2.4 Provide advice and guidance to users, customers and <i>stakeholders</i> according to legislative and enterprise requirements. 2.5 Identify and investigate breaches of the usage provisions and report the results and/or recommendations according to legislative and enterprise requirements.
<b>3 Report on the implementation of the wastewater collection management plan.</b>	3.1 Identify deviations from the wastewater collection management plan. 3.2 Review and report objectives of the management and implementation plans. 3.3 Make recommendations for changes to plan objectives and operational maintenance procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- assess environmental impacts
- solve problems.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- environmental legislation
- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement and manage the plans for wastewater collection networks and systems including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and the results of wastewater testing and monitoring) to underpin the implementation of the wastewater collection management plan
- planning and implementing testing processes and programs
- monitoring and evaluating the outcomes of the wastewater collection management plan
- providing advice and communicating with stakeholders and users
- preparing reports and recommendations for future action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Wastewater*** collection systems may include:

- gravity pipe systems
- pressure pipe systems
- pump stations and pumping systems
- odour control systems
- gully traps, manholes and valve pits
- overflow storage and treatment systems
- stormwater infiltration control systems
- trade waste and domestic connections and drains.

***Historic system*** information may include:

- previous studies
- impact of weather
- relevant hydrological information
- system models.

***Legislative requirements*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- trade waste policies
- relevant government and quasi government authorities' rules (eg Great Barrier Reef Marine Park Authority, Environment Protection Authority).

***Monitoring and testing*** may include:

- physical analysis of water:
  - pH
  - conductivity
  - colour
  - turbidity
- chemical analysis of water:
  - chlorine
  - alkalinity
  - chemical oxygen demand
  - heavy metals
  - sulphides
- microbiological analyses:
  - coliforms
  - plate counts



## RANGE STATEMENT

- physical measures:
- power
- chemicals
- water flows
- sludge volumes
- mechanical testing:
- vibration
- noise
- temperature
- fauna and flora surveys
- gas detection and testing
- odour testing
- stakeholder surveys.

*Stakeholders* may include:

- conservation groups
- community action groups
- general community
- industry groups and companies
- catchment users
- government (all levels)
- quasi government organisations
- treatment plant operator enterprises
- chemical suppliers
- consultants
- equipment suppliers.

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Collection and distribution

# NWP537B Develop and review wastewater collection management plan

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to develop and review of the management plan for the operation and maintenance of wastewater collection networks and systems.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of the wastewater collection management system

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for the development of a wastewater collection management plan.</b>	1.1 Identify and interpret <i>wastewater collection and transport system</i> requirements, including <i>legislative</i> and enterprise policies. 1.2 Access and interpret <i>historic wastewater collection system information</i> relevant to the management process. 1.3 Identify issues that impact on the collection and transport of wastewater. 1.4 Identify users' (generators and processors) and <i>stakeholders'</i> requirements that impact on the wastewater collection system.
<b>2 Develop a wastewater collection management plan.</b>	2.1 Determine and apply system performance requirements according to legislative and enterprise procedures. 2.2 Identify and quantify environmental and community factors that impact on the wastewater collection system. 2.3 Monitor <i>information</i> that impacts on the planning process according to enterprise procedures. 2.4 Identify, quantify and define available resources. 2.5 Prepare and present the wastewater collection management plan.
<b>3 Review and refine the wastewater collection management plan.</b>	3.1 Identify deviations from the wastewater collection management plan. 3.2 Identify and evaluate changes required to meet the wastewater collection management plan. 3.3 Identify and evaluate changes to the wastewater collection management plan as a result of changes in legislative, enterprise, community, user and stakeholder requirements. 3.4 Report and recommend changes to the wastewater collection management plan according to legislative and enterprise requirements. 3.5 Modify and update the wastewater collection management plan, incorporating accepted recommendations. 3.6 Implement changes to the wastewater collection management plan.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- assess environmental impact
- solve problems.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- environmental legislation
- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to develop and review of the management plan for the operation and maintenance of wastewater collection networks and systems including:

- gathering, interpreting and synthesising information (including historical system data, current legislation and standards, stakeholder views and monitoring results) to underpin the sound development of the wastewater collection management plan
- consulting widely and effectively
- developing effective wastewater collection management plans that address the water organisation's objectives and requirements
- using data from monitoring arrangements to track the performance of the wastewater collection management plan and inform the review of the plan
- preparing reports and recommendations for changes to the objectives of the management plan and its implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

number of performances assessed at different points in time and separated by further learning and practice

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

The ***wastewater collection and transport system*** may include:

- gravity pipe systems
- pressure pipe systems
- pump stations and pumping systems
- odour control systems
- gully traps, manholes and valve pits
- overflow storage and treatment systems
- stormwater infiltration control systems
- trade waste
- domestic connections and drains.

***Legislative*** policies may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- trade waste policies
- relevant government and quasi government authorities' rules (eg Great Barrier Reef Marine Park Authority, Environment Protection Authority).

***Historic wastewater collection system information*** may include:

- previous studies
- impact of weather
- relevant hydrological information
- system models.

***Stakeholders*** may include:

- conservation groups
- community action groups
- general community
- industry groups and companies
- catchment users
- government (all levels) and quasi government organisations
- treatment plant operator enterprises
- chemical suppliers
- consultants
- equipment suppliers.

***Information*** may be gathered through

- physical analysis of water:
- pH



## **RANGE STATEMENT**

monitoring and testing including:

- conductivity
- colour
- turbidity
- chemical analysis of water:
  - chlorine
  - alkalinity
  - chemical oxygen demand
  - heavy metals
  - sulphides
- microbiological analyses:
  - coliforms
  - plate counts
- physical measures:
  - power
  - chemicals
  - water flows
  - sludge volumes
- mechanical testing:
  - vibration
  - noise
  - temperature
- fauna and flora surveys
- gas detection and testing
- odour testing
- stakeholder surveys.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Collection and distribution

## **NWP545B Implement and manage water treatment processes monitoring program**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to implement and manage the water treatment processes management plan including the treatment of raw water supplies to potable standards.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of the water treatment processes monitoring program.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Implement and coordinate a water treatment process monitoring program.</b>	1.1 Confirm performance measures for the water treatment management plan. 1.2 Design and implement <i>monitoring</i> and <i>testing</i> programs according to the objectives of the water treatment management plan and relevant <i>environmental factors</i> . 1.3 Analyse, interpret and report testing results according to legislative and enterprise requirements. 1.4 Identify and investigate problems and/or potential problems and report results and recommendations according to legislative and enterprise requirements. 1.5 Store results and reports according to legislative and enterprise requirements.
<b>2 Monitor and optimise the process and production.</b>	2.1 Monitor treatment process resource usage according to the water treatment management plan. 2.2 Implement emergency action plans according to the water treatment management plan. 2.3 Identify, report and recommend opportunities for process performance improvements according to the water treatment management plan. 2.4 Provide advice and guidance to <i>customers</i> and stakeholders on <i>issues and resources</i> according to legislative and enterprise requirements. 2.5 Review, interpret and action stakeholder and customer requirements according to the water treatment management plan. 2.6 Identify and investigate breaches of the water treatment management plan provisions, report the results and/or recommendations and action according to legislative and enterprise requirements.
<b>3 Report on the implementation and monitoring of the plan.</b>	3.1 Identify, investigate and report deviations from planned treatment parameters and quality and management plan requirements. 3.2 Review objectives of the management and implementation plans. 3.3 Make recommendations for changes to plan objectives and operational procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- assess environmental impacts
- use data to inform planning processes
- coordinate operations and maintenance activities.

#### **Required knowledge:**

- relevant legislation
- laboratory procedures
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- environmental legislation
- enterprise financial systems and key performance indicators
- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement and manage the water treatment processes' management plan including the treatment of raw water supplies to potable standards including:

- gathering, interpreting and synthesising information (including historical system data, current legislation and standards, stakeholder views and monitoring results) required to implement and monitor a water treatment processes monitoring plan
- ensuring monitoring and testing programs are run efficiently and effectively
- using data from monitoring arrangements to track the performance of the water treatment processes monitoring plan and inform the review of the plan
- preparing reports and recommendations for changes to the objectives of the management plan and its implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Monitoring*** may include:

- process control monitoring
- mechanical and electrical maintenance schedules
- mechanical and electrical equipment condition
- licensing requirements
- legislative requirements
- chemical, physical, biological and microbiological quality.

***Testing*** may include but not be limited by:

- physical analysis of water:
  - pH
  - conductivity
  - colour
  - turbidity
- chemical analysis of water:
  - chlorine
  - alkalinity
  - chemical oxygen demand
  - heavy metals
  - iron
  - manganese
- microbiological analyses:
  - coliforms
  - plate counts
  - algae identification and counts
- physical measures:
  - power
  - chemicals
  - water flows
  - sludge volumes
- mechanical testing:
  - vibration
  - noise
  - temperature.

***Environmental factors*** that

- flora



## RANGE STATEMENT

impact on the treatment process may include:

- fauna
- organic and inorganic chemicals
- salinity (in a marine environment)
- nutrients
- oils and greases
- pesticides
- trade waste
- upstream communities and activities
- natural events (eg floods, fires)
- algae
- micro-organisms
- geology of catchment
- tastes and odours.

*Customers* may include:

- individual consumers
- regulators
- suppliers
- government
- community or specific enterprises
- industry
- rural consumers
- internal and external customers.

*Issues and resources* to be considered may include:

- chemicals used/usage
- electricity used/usage
- gas used/usage
- people available
- technical skills and training
- funds available for capital and/or operation
- maintenance standards of plant and equipment
- maintenance procedures and schedules
- union expectations
- community expectations
- the natural environment
- the built environment
- occupational health and safety requirements.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

# **NWP546B Develop and review water treatment process management plan**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to develop and review the management plan for the treatment of raw water supplies to potable standards.

## **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the implementation of water treatment management plans.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan and prepare for water treatment.</b>	1.1 Identify and interpret treatment plant management requirements, including legislative and enterprise policies. 1.2 Identify and assess process capability and performance design. 1.3 Access, review and interpret historic information, relevant to the treatment of water. 1.4 Identify and interpret <i>issues</i> that impact on the treatment of water. 1.5 Identify and interpret stakeholder and <i>customer</i> requirements that impact on the treatment processes. 1.6 Identify and interpret water catchment impacts.
<b>2 Develop a water treatment management plan.</b>	2.1 Identify and interpret water quality and quantity requirements according to legislative and enterprise procedures. 2.2 Identify and assess <i>environmental factors</i> that impact on the treatment of water. 2.3 Identify, specify and monitor <i>testing</i> and <i>monitoring</i> procedures according to organisational requirements. 2.4 Monitor information that impacts on the planning process according to enterprise procedures. 2.5 Identify, quantify and define available resources. 2.6 Prepare and present the water treatment management plan.
<b>3 Review and refine the water treatment management plan.</b>	3.1 Identify deviations from the treatment management plan. 3.2 Identify and evaluate system changes to meet the requirements of the treatment management plan. 3.3 Report and recommend changes to the treatment management plan according to legislative and organisational requirements. 3.4 Incorporate accepted recommendations into the updated and modified treatment management plan. 3.5 Implement changes to the treatment management plan.
<b>4 Complete documentation.</b>	4.1 Maintain records of plant and system data according to organisational and statutory requirements. 4.2 Report observations outside defined parameters for further action.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- assess environmental impacts.

#### **Required knowledge:**

- relevant legislation
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- customer expectations and requirements
- environmental legislation
- enterprise financial systems and key performance indicators
- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to develop and review the management plan for the treatment of raw water supplies to potable standards including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and the results of water treatment system testing and monitoring) to underpin the implementation of the water treatment processes management plan
- planning and implementing testing processes and programs
- monitoring and evaluating the outcomes of the water treatment processes management plan
- providing advice and communicating with stakeholders and users
- preparing reports and recommendations for future action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.



## Range Statement

### 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. Add any 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.

***Issues*** and/or resources to be considered may include:

- chemicals used/usage
- electricity used/usage
- gas used/usage
- people available
- technical skills and training
- funds available for capital and/or operation
- maintenance standards of plant and equipment
- maintenance procedures and schedules
- previous risk assessments
- union expectations
- community expectations
- the natural environment
- the built environment
- occupational health and safety requirements.

Customers may include:

- individual consumers
- regulators
- suppliers
- government
- community or specific enterprises
- industry
- rural consumers
- internal and external customers.

***Environmental factors*** that impact on the treatment process may include:

- flora
- fauna
- organic and inorganic chemicals
- salinity (in a marine environment)
- nutrients
- oils and greases
- pesticides
- trade waste
- upstream communities and activities
- natural events (eg floods, fires)
- algae

## RANGE STATEMENT

*Testing* may include, but not be limited by:

- micro-organisms
- geology of catchment
- tastes and odours.
- physical analysis of water:
  - pH
  - conductivity
  - colour
  - turbidity
- chemical analysis of water:
  - chlorine
  - alkalinity
  - chemical oxygen demand
  - heavy metals
  - iron
  - manganese
- microbiological analyses:
  - coliforms
  - plate counts
  - algae identification and counts
- physical measures:
  - power
  - chemicals
  - water flows
  - sludge volumes
- mechanical testing:
  - vibration
  - noise
  - temperature.

*Monitoring* may include:

- process control monitoring
- mechanical and electrical maintenance schedules
- mechanical and electrical equipment condition
- licensing requirements
- legislative requirements
- chemical, physical, biological and microbiological quality.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

## **NWP547B Implement and manage wastewater treatment processes monitoring program**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to implement and manage the treatment management plan for wastewater treatment activities.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the implementation of wastewater treatment management plans.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<p><b>1 Implement and coordinate wastewater treatment process monitoring program.</b></p>	<p>1.1 Confirm performance measures for the wastewater treatment management plan.</p> <p>1.2 Develop the implementation plan in conformance with <i>legislation</i>, organisational requirements and <i>environmental factors</i>.</p> <p>1.3 Design and implement the <i>monitoring</i> and <i>testing</i> programs according to the objectives of the wastewater treatment management plan.</p> <p>1.4 Analyse, interpret and report testing results according to legislative and enterprise requirements.</p> <p>1.5 Identify and investigate problems and/or potential problems and report results and recommendations according to legislative and enterprise requirements.</p> <p>1.6 Store results and reports according to legislative and enterprise requirements.</p>
<p><b>2 Monitor and optimise the process and production.</b></p>	<p>2.1 Monitor treatment process resource usage according to the wastewater treatment management plan.</p> <p>2.2 Implement emergency action plans according to the wastewater treatment management plan.</p> <p>2.3 Identify, report and recommend opportunities for process performance improvements according to the wastewater treatment management plan.</p> <p>2.4 Provide advice and guidance to effluent/sludge <i>customers</i> and stakeholders according to legislative and enterprise requirements.</p> <p>2.5 Review, interpret and action stakeholder and customer requirements according to the wastewater treatment management plan.</p> <p>2.6 Identify and investigate breaches of the wastewater treatment management plan provisions with the results and/or recommendations reported and actioned according to legislative and enterprise requirements.</p>
<p><b>3 Report on implementation and monitoring of the plan.</b></p>	<p>3.1 Identify, investigate and report deviations from planned treatment parameters and quality and management plan requirements.</p> <p>3.2 Review objectives of the management plan.</p> <p>3.3 Make recommendations for changes to plan objectives and operational procedures.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- assess environmental impacts
- coordinate operation and maintenance activities.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- risk management principles
- customer expectations and requirements
- enterprise financial systems and key performance indicators
- environmental legislation
- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to implement and manage the treatment management plan for wastewater treatment activities including:

- gathering, interpreting and synthesising information (including historical data, current legislation and standards, stakeholder views and the results of wastewater treatment testing and monitoring) to underpin the implementation of the wastewater treatment processes management plan
- planning and implementing testing processes and programs
- monitoring and evaluating the outcomes of the wastewater treatment processes management plan
- providing advice and communicating with stakeholders and users
- preparing reports and recommendations for future action.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the



## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislation*** may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- Australian Standards.

***Environmental factors*** that impact on the treatment process may include:

- Flora
- Fauna
- organic and inorganic chemicals
- sediment impacts in discharge environment
- nutrients
- oils and greases
- pesticides
- trade waste
- communities activities and attitudes
- natural events (eg floods, fires)
- industry activities and attitudes
- micro-organisms
- odour dispersion.

***Monitoring*** may include:

- process control monitoring
- mechanical and electrical maintenance schedules
- mechanical and electrical equipment condition
- licensing requirements
- legislative requirements
- chemical, physical, biological and microbiological quality.

***Testing*** may include but not be limited by:

- physical analysis of wastewater:
- pH
- conductivity
- suspended solids
- chemical analysis of wastewater
- chlorine
- nutrients
- chemical oxygen demand
- heavy metals

## RANGE STATEMENT

- microbiological analyses:
- coliforms
- plate counts
- algae identification and counts
- physical measures:
- power
- chemicals
- wastewater flows
- sludge volumes
- mechanical testing:
- vibration
- noise
- temperature.
- individual consumers
- regulators
- suppliers
- government
- community or specific enterprises
- industry.

*Customers* may include:

## Unit Sector(s)

Not applicable.

## Competency field

**Competency field**      Treatment

## **NWP548B Develop and review wastewater treatment management plan**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to develop and monitor policies and plans for the treatment of wastewater.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers in water organisations with responsibility for the management of the wastewater treatment process.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<p><b>1 Plan and prepare for wastewater treatment.</b></p>	<p>1.1 Identify and interpret wastewater treatment plant management requirements including <i>legislative</i> and enterprise policies.</p> <p>1.2 Access, review and interpret historic information relevant to the treatment of wastewater.</p> <p>1.3 Identify and interpret issues that impact on the treatment of wastewater.</p> <p>1.4 Identify and interpret stakeholder and <i>customer</i> requirements that impact on the discharge environment.</p> <p>1.5 Identify and interpret wastewater catchment impacts.</p>
<p><b>2 Develop a wastewater treatment management plan.</b></p>	<p>2.1 Identify and interpret wastewater quality and quantity requirements according to legislative and enterprise requirements.</p> <p>2.2 Identify and assess <i>environmental factors</i> that impact on the treatment of wastewater.</p> <p>2.3 Identify and assess <i>testing</i> and <i>monitoring</i> processes and incorporate into the plan's development.</p> <p>2.4 Monitor information that impacts on the planning process according to enterprise procedures.</p> <p>2.5 Identify, quantify and define available resources.</p> <p>2.6 Prepare and present the wastewater treatment management plan.</p>
<p><b>3 Review and refine wastewater treatment management plan.</b></p>	<p>3.1 Identify deviations from the management plan.</p> <p>3.2 Identify and evaluate system changes to meet the requirements of the treatment management plan.</p> <p>3.3 Identify and evaluate changes to the management plan required due to legislative, organisational, community and stakeholder requirements.</p> <p>3.4 Report and recommend changes to the management plan according to legislative and organisational requirements.</p> <p>3.5 Incorporate accepted recommendations into the updated and modified wastewater treatment management plan.</p> <p>3.6 Implement changes to the management plan.</p>

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- communicate effectively
- plan effectively
- prepare reports
- interpret and apply legislation and policies
- coordinate measuring and testing activities
- use mathematical and scientific techniques to interpret test results
- conduct investigations
- assess environmental impacts
- use data to inform planning processes
- coordinate operations and maintenance activities.

#### **Required knowledge:**

- relevant legislation
- relevant enterprise policies
- range of appropriate measuring and testing procedures
- investigation procedures
- customer expectations and requirements
- enterprise financial systems and key performance indicators
- environmental legislation
- occupational health and safety legislation.

## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to develop and monitor policies and plans for the treatment of wastewater including:

- gathering, interpreting and synthesising information (including historical system data, current legislation and standards, stakeholder views and monitoring results) to underpin the sound development of the wastewater treatment management plan
- consulting widely and effectively
- developing effective wastewater treatment management plans that address the water organisation's objectives and requirements
- using data from monitoring arrangements to track the performance of the wastewater treatment management plan and inform the review of the plan
- preparing reports and recommendations for changes to the objectives of the management plan and its implementation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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



## EVIDENCE GUIDE

- time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative*** requirements may include:

- relevant federal legislation
- relevant state or territory legislation
- relevant local government by-laws
- Australian Standards.

***Customer*** may include:

- individual consumers
- regulators
- suppliers
- government
- community or specific enterprises
- industry.

***Environmental factors*** that impact on the treatment process may include:

- flora
- fauna
- organic and inorganic chemicals
- sediment impacts in discharge environment
- nutrients
- oils and greases
- pesticides
- trade waste
- community activities and attitudes
- natural events (eg floods, fires)
- industry activities and attitudes
- micro-organisms
- odour dispersion.

***Testing*** may include but not be limited by:

- physical analysis of wastewater:
- pH
- conductivity
- suspended solids
- chemical analysis of wastewater:
- chlorine
- nutrients
- chemical oxygen demand
- heavy metals
- microbiological analyses:

## RANGE STATEMENT

- coliforms
- plate counts
- algae identification and counts
- physical measures:
  - power
  - chemicals
  - wastewater flows
  - sludge volumes
- mechanical testing:
  - vibration
  - noise
  - temperature.

*Monitoring* may include:

- process control monitoring
- mechanical and electrical maintenance schedules
- mechanical and electrical equipment condition
- licensing requirements
- legislative requirements
- chemical, physical, biological and microbiological quality.

## Unit Sector(s)

Not applicable.

## Competency field

Competency field      Treatment

## **NWP551A Evaluate, implement and monitor high-risk trade waste discharge approvals**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to assess and process applications for high-risk trade waste discharges from large and complex industrial organisations, monitor compliance with the trade waste approval issued and renew, amend, suspend or revoke trade waste discharge approvals as appropriate.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for trade waste officers or inspectors with a specific responsibility for managing applications and approvals for high-risk liquid trade waste discharges to wastewater collection systems from large and complex industrial organisations.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability Skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Advise customers on trade waste approval procedures.</b>	1.1 Comprehensively answer <i>customer</i> queries regarding applications for <i>high-risk trade waste</i> approval with reference to <i>organisational and statutory requirements</i> . 1.2 Comprehensively answer customer queries regarding the procedures involved in processing and approving trade waste applications with reference to organisational requirements. 1.3 Comprehensively answer customer queries regarding the procedures involved in monitoring and renewing trade waste applications with reference to organisational requirements.
<b>2 Evaluate trade waste discharges for new types of industries and/or new types of industry processes.</b>	2.1 Identify significant pollutants generated by new types of industries, processes or sources. 2.2 Identify, interpret and assess information about known impacts, risk assessments and control. 2.3 Identify trade waste management processes and workplace procedures for new types of industries, processes or sources. 2.4 Develop and check contingency plans for new types of industries or processes. 2.5 Prepare trade waste management policies and plans for new types of industries and processes.
<b>3 Assess applications for high-risk trade waste discharge approvals.</b>	3.1 Assess high-risk trade waste applications to establish that all necessary <i>documentation</i> has been provided. 3.2 Assess high-risk trade waste applications against concentration, mass and flow limits, discharges of prohibited substances, <i>local sewerage issues</i> and consider environmental issues. 3.3 Assess proposed pre-treatment systems for suitability. 3.4 Assess monitoring, control systems and procedures for suitability. 3.5 Assess the adequacy of chemical storage, handling and spill prevention as appropriate. 3.6 Schedule and conduct onsite inspections as required.
<b>4 Implement approved trade waste discharge applications.</b>	4.1 Determine approval conditions on the basis of assessments and discuss with the applicant. 4.2 Calculate estimates of charges and discuss with the customer according to established charging policies and formulae. 4.3 Where applicable, monitor construction and commissioning activities to ensure compliance with approvals. 4.4 Determine <i>monitoring activities and schedules</i> and discuss with the customer.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
	4.5 Create and maintain database records, including charging parameters and monitoring schedule.
<b>5 Monitor customer trade waste treatment and disposal and review trade waste approval.</b>	5.1 Conduct routine monitoring of the compliance of customer trade waste treatment and discharge according to the trade waste approval and organisational requirements.
	5.2 Establish processes to identify and report non-compliances with trade waste approvals according to organisational requirements.
	5.3 Identify and implement enforcement measures and processes to manage identified non-compliances.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- interpret and review hydraulic, architectural and site plans
- identify and evaluate trade waste-producing processes
- evaluate process inputs and outputs using relevant methodologies such as Mass Balance and Process Yield
- apply risk assessment and management based on AS 4360
- use flow measuring or flow assessment techniques
- use appropriate wastewater sampling and preservation techniques for onsite and laboratory testing
- interpret and evaluate sample analysis data
- interpret and apply legislation and policies applicable to trade waste
- develop monitoring plans and coordinate measuring, testing and sampling activities
- plan and conduct investigations
- assess environmental impact using ISO 14001 where appropriate
- assess waste treatment methods, processes plant and equipment
- negotiate and communicate
- use appropriate personal protective equipment for protection against physical, chemical and biological hazards.

#### Required knowledge:

- relevant legislation
- relevant enterprise policies for trade waste management
- water quality parameters of significance to the wastewater system
- personal protection and safety precautions for wastewater sampling, including the requirement for relevant inoculations such as:
  - Q Fever
  - Hepatitis A&B
  - Polio
  - Tetanus
  - Diphtheria
- industrial waste treatment methods and processes for high risk industrial organisations
- hydraulics, chemistry and/or equivalent science
- basic knowledge of wastewater collection, treatment and disposal systems
- investigation procedures
- range of appropriate measuring, testing sampling procedures
- customer expectations and requirements
- occupational health and safety legislation.





## 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, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to evaluate, implement and monitor high-risk trade waste discharge approvals, including:

- advising customers of the trade waste management policies and procedures in operation
- advising customers of requirements for obtaining and complying with trade waste discharge approvals
- assessing and evaluating applications for high-risk trade waste treatment and disposal
- implementing charging and monitoring procedures
- completing records and reports.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Customer*** may include:

- new or existing wholesale commercial organisations
- new or existing large and complex manufacturing and industrial organisations.
- new or existing large community facilities such as hospitals and educational institutions.

***High-risk trade waste*** may include:

- the liquid waste generated by any business or industry which involves one or more of the following characteristics:

- high discharge rates
- large discharge volumes
- high contaminant concentrations
- large contaminant loads
- contaminants of OHS concern
- contaminants of environmental/ecological concern
- trade waste does not include domestic wastewater.

***Organisational and statutory requirements*** may include:

- relevant legislation, for example:
  - commonwealth environmental legislation
  - state water legislation
  - state environmental legislation
  - local by-laws
- International Standards, for example:
  - ISO 14000 standards
  - Australia/New Zealand Standards, for example:
    - National Plumbing and Drainage Code AS/NZS 3500
- relevant industry codes of practice for the management of trade waste, for example:
  - industry Code of Practice for the Photographic Industry (PURE)
  - National Health and Medical Research Council's (NHMRC) National guidelines for waste management in the health care industry, 1999
  - state plumbing and drainage code of practice
  - requirements of regulatory authorities, such as:

## RANGE STATEMENT

- Documentation* may include:
- water authorities
  - WorkCover
  - EPA
  - Health Department
  - local councils.
  - identification of all waste producing processes
  - detailed process information including all inputs and outputs
  - water balance
  - site hydraulic plan
  - site plan
  - equipment specification and process information for the proposed pre-treatment facility
  - proposed flow measurement and other monitoring facilities
  - proposed monitoring plan
  - relevant environmental impact assessments
  - proposed chemical and waste management contingency plans
  - proposed effluent improvement plan
  - stormwater drainage plan.
- Local sewerage issues* may include:
- impact of proposed wastewater quantity and quality on the environment including odour management
  - effluent management, re-use and disposal
  - biosolids management, re-use and disposal
  - impact on health and safety of water utility employees
  - impact of proposed wastewater quantity and quality on the sewerage infrastructure
  - impact of proposed wastewater quantity and quality on the sewage treatment processes.
- Monitoring activities and schedules* may include:
- inspections of trade waste sites, processes and treatment facilities
  - meter reading and discharge volume recording
  - maintenance and calibration schedules and reporting
  - sampling and testing locations, techniques and frequencies
  - customer self monitoring programs and reporting
  - on-line monitoring and/or alarms
  - record keeping and reporting.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Trade waste

# NWP701A Contribute to the development of a complex water organisation

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to combine a detailed understanding and analysis of the water industry with existing in-depth technical skills to optimise personal contribution to the water organisation. The ability to synthesise data from a variety of sources to support planning and decision making, together with the application of analytical skills to review and refine organisational policies, plans and processes are essential to performance.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers and senior technical practitioners from a variety of disciplines and backgrounds who are applying their skills to the management of a function, team or division within the water organisation. The unit has particular application for new entrants to the industry who have higher education qualifications but who do not have relevant industry experience.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Analyse structure and challenges of the water industry.</b>	1.1 Review and analyse structure, size, diversity and role of the water industry in Australia.
	1.2 Review <i>legislative requirements</i> underpinning operations of water organisation and analyse their application.
	1.3 Review and analyse major and strategic factors that impinge on organisation's capacity to meet community's current and future water supply needs.
<b>2 Analyse structure and service delivery of the organisation.</b>	2.1 Review and analyse organisational structure, plans, services, and service charter of organisation.
	2.2 Review and analyse infrastructure and systems used to deliver services.
	2.3 Review current and projected performance of organisation and its service delivery against relevant plans and performance indicators.
	2.4 Identify, document and communicate relevant opportunities for improvement to service delivery.
<b>3 Plan for environmental sustainability.</b>	3.1 Review and assess strategic factors that impinge on development and application of <i>environmentally sustainable practices</i> .
	3.2 Review and assess organisation's relevant environmental management policies and objectives.
	3.3 Review and audit effectiveness of current environmental processes and practices against organisation's environmental management plans.
	3.4 Identify, document and communicate opportunities to improve environmental policies and practices.
<b>4 Improve policies, plans and processes.</b>	4.1 Review and analyse policies, plans and processes within own scope of authority.
	4.2 Review opportunities to improve policies, plans and processes in consultation with relevant personnel.
	4.3 Document and communicate recommendations and outcome of review of policies, plans and processes.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret, analyse and review complex policy and industry documentation
- interpret, analyse and apply relevant legislative requirements
- apply analytical skills to review of policies, plans and procedures
- consult and communicate with internal and external groups and individuals
- retrieve and evaluate information
- communicate effectively
- prepare reports
- use literacy skills in regard to verbal and written communication in the workplace
- solve problems.

#### **Required knowledge:**

- the structure of the water industry, networks, relationships, stakeholders and interests
- the economic, environmental, social and political issues and trends influencing the water and allied industries
- organisational structure, policies, strategic plans, and operating procedures
- organisational contracts, services, assets and infrastructure
- principles and methods for reviewing, auditing and monitoring organisational and system performance
- relevant legislative and licensing requirements and their implementation issues and accountability.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to combine a detailed understanding and analysis of the water industry with existing in-depth technical skills to optimise personal contribution to the water organisation including:

- researching industry structure, size and trends
- reviewing and critically evaluating industry and organisational data to form evidence-based assessments and decisions
- conducting reviews of current policies, plans and processes to deliver improved outcomes
- preparing reports and communicating outcomes effectively to other organisational leaders.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative requirements*** may include:

- relevant federal and state or territory legislation
- relevant local government by-laws
- relevant government and non-government policies and regulations
- relevant community planning and development agreements, such as land care agreements.

***Environmentally sustainable practices*** may include:

- minimising factors that contribute to environmental degradation
- directly or indirectly minimising production of greenhouse gases
- other contributing factors, including:
  - minimisation of waste materials
  - correct use of enterprise vehicles and machinery
  - re-use or recycling of trade materials where possible
  - overall reduction of energy usage through general awareness
  - use of appropriate technologies
  - licensing agreements
  - proper disposal of waste materials
  - restriction of burning off
  - correct handling of toxic substances
  - containment of chlorofluorocarbons and other hazardous substances.

### Unit Sector(s)

Not applicable.

## Competency field

Competency field      Leadership

## **NWP702A Apply water industry legislation, codes and standards**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to interpret and apply the legislation, codes and standards that underpin the operation of water organisations. The ability to access, review and interpret complex legal and technical documents and prepare reports is essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers and senior technical practitioners from a variety of disciplines and backgrounds who are applying their skills to the management of a function, team or division within the water organisation. The unit has particular application for new entrants to the industry who have higher education qualifications but who do not have relevant industry experience.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Access and interpret relevant code and standard requirements.</b>	1.1 Review <i>legislative requirements</i> underpinning operations of water organisation and analyse their application. 1.2 Review <i>industry codes and standards</i> relevant to performance of specific job role and analyse their application. 1.3 Review and critically evaluate current processes for monitoring performance against legislation, codes and standards.
<b>2 Manage compliance and reporting functions.</b>	2.1 Review organisational standards and processes for reporting compliance with legislative requirements. 2.2 Identify, document and apply opportunities for improvement of reporting processes. 2.3 Collect and collate data to support preparation of required reports and compliance information and review data for completeness and accuracy. 2.4 Complete reporting processes according to organisational standards and legislative requirements. 2.5 Monitor and report costs and resource implications of operating compliance and reporting functions.
<b>3 Communicate compliance and reporting information to team members.</b>	3.1 Communicate policies, plans and processes required to ensure proper application of legislation, codes and standards underpinning operation of division or team. 3.2 Review and put in place steps to monitor compliance and reporting functions. 3.3 Take corrective action to meet identified areas of non-compliance, communicate to team members and report according to legislative and organisational requirements.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- interpret, analyse, review and apply complex industry codes and standards
- interpret, analyse and apply relevant legislative requirements
- apply analytical skills to review of policies, plans and procedures
- consult and communicate with internal and external groups and individuals
- retrieve and evaluate information
- communicate effectively with a wide range of audiences inside and outside the workplace
- prepare complex reports
- solve a wide range of complex problems.

#### **Required knowledge:**

- the structure of the water industry, networks, relationships, stakeholders and interests
- the economic, environmental, social and political issues and trends influencing the water and allied industries
- organisational structure, policies, strategic plans, and operating procedures
- organisational contracts, services, assets and infrastructure
- principles and methods for reviewing, auditing and monitoring organisational and system performance
- current processes for monitoring performance against legislation, codes and standards
- reporting processes according to organisational standards and legislative requirements
- risk management principles and strategies and the management of non-compliance
- relevant legislative and licensing requirements and their implementation issues and accountability.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to interpret and apply the legislation, codes and standards that underpin the operation of water organisations including:

- researching, interpreting and applying relevant legislative requirements and industry codes and standards
- reviewing and critically evaluating organisational compliance and reporting processes
- critically evaluating and validating data used in compilation of compliance and other reporting processes
- managing and reviewing compliance and reporting processes
- conducting reviews of current policies and processes to deliver improved outcomes
- preparing reports and communicating outcomes effectively to staff members and other organisational leaders.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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

## EVIDENCE GUIDE

- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative requirements*** may include:

- relevant federal legislation, including:
  - National Water Commission Act 2004
  - Environment Protection and Biodiversity Conservation Act 1999
- relevant state or territory legislation relating to water and resource management
- relevant state or territory legislation and regulations relating to OHS, including:
  - protective clothing and equipment
  - use of tools and equipment
  - workplace environment and safety
  - handling of materials
  - use of fire fighting equipment
  - use of first aid equipment
  - hazard control and hazardous materials and substances
- relevant local government by-laws
- relevant government and non-government policies and regulations, such as:
  - National Water Initiative
  - Murray Darling Basin Water Agreement
  - relevant community planning and development agreements, such as land care agreements.
- Australian Drinking Water Guidelines
- water supply code of Australia
- sewerage pumping state code of Australia
- sewerage code of Australia
- relevant Australian and New Zealand standards (AS/NZS)
- international standards (ISO).

***Industry codes and standards*** may include:

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Leadership

## NWP703A Lead water planning processes

### Modification History

Not applicable.

### Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required for effective contribution to the medium and long-term planning of water system infrastructure and service delivery. The ability to access, review and interpret complex demographic and technical documents, evaluate alternative options, communicate with a range of stakeholders and formulate logical solutions is essential to performance.

### Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers and senior technical practitioners from a variety of disciplines and backgrounds who are applying their skills to the management of a function, team or division within the water organisation.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

Not applicable.

### Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Conduct research to underpin planning process.</b>	1.1 Forecast medium and long-term demand for water services using population and usage trend data. 1.2 Research and evaluate current or forecast changes to technology that will affect infrastructure or service delivery. 1.3 Analyse <i>legislative requirements</i> for provision of water services. 1.4 Review and evaluate current water system infrastructure or service delivery capacity. 1.5 Evaluate and estimate water organisation's capacity to meet medium- and long-term demand.
<b>2 Formulate strategy and plan.</b>	2.1 Develop key goals and <i>performance indicators</i> for planned water infrastructure or service delivery system in consultation with relevant personnel. 2.2 Identify, evaluate and document options for infrastructure or service delivery systems against established performance indicators. 2.3 Conduct consultations with relevant external stakeholders and evaluate input used to inform plan's development. 2.4 Recommend preferred option to relevant personnel following appropriate consultation and planning processes. 2.5 Develop <i>plan</i> for implementation of preferred strategy according to organisational standards.
<b>3 Lead implementation process.</b>	3.1 Put in place processes to monitor performance of implementation plan against agreed benchmarks and performance indicators. 3.2 Plan, implement and monitor reporting processes. 3.3 Plan, implement and monitor communication processes to inform staff and other relevant stakeholders of progress of plan's implementation. 3.4 Undertake review or refinement of planned tasks in light of changing conditions to ensure attainment of plan's goals.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- research, interpret, analyse, review and apply complex supply and demand data
- interpret, analyse and apply relevant legislative requirements
- apply analytical skills to review of policies, plans and infrastructure
- consult and communicate with internal and external groups and individuals
- retrieve and evaluate information
- communicate effectively with a wide audience inside and outside the workplace
- prepare reports
- solve a wide range of complex problems.

#### **Required knowledge:**

- the structure of the water industry, networks, relationships, stakeholders and interests
- principles and methodology for research and forecasting in system and service planning
- the economic, environmental, social and political issues and trends influencing the water and allied industries
- organisational structure, policies, strategic plans, and operating procedures
- organisational contracts, services, assets and infrastructure
- principles and methods for reviewing, auditing and monitoring organisational and system performance
- current processes for monitoring performance against legislation, codes and standards
- research and reporting processes related to organisational standards and legislative requirements
- risk management principles and strategies and the management of non-compliance
- relevant legislative and licensing requirements and their implementation issues and accountability.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to contribute to the medium and long-term planning of water system infrastructure and service delivery including:

- researching, interpreting, analysing and applying complex supply and demand data to planning process
- reviewing and critically evaluating current infrastructure and service delivery systems
- objectively evaluating options for future infrastructure and service delivery systems against specified performance indicators
- preparing plans
- communicating with stakeholders
- monitoring and managing the implementation of a plan.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning

## EVIDENCE GUIDE

experience must include a combination of direct, indirect and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative requirements*** may include:

- relevant federal legislation, including:
  - National Water Commission Act 2004
  - Environment Protection and Biodiversity Conservation Act 1999
- relevant state or territory legislation relating to water and resource management
- relevant state or territory legislation and regulations relating to OHS, including:
  - protective clothing and equipment
  - use of tools and equipment
  - workplace environment and safety
  - handling of materials
  - use of fire fighting equipment
  - use of first aid equipment
- hazard control and hazardous materials and substances
- relevant local government by-laws
- relevant government and non-government policies and regulations, such as:
  - National Water Initiative
  - Murray Darling Basin Water Agreement
- relevant community planning and development agreements, such as land care agreements.

***Performance indicators*** to evaluate options for infrastructure and service delivery systems may include:

- cost efficiency
- flexibility and ability to respond to changing community demands
- environmental sustainability
- congruence with current infrastructure
- level of staff required for operations
- maintenance costs.

***Plan*** for implementation of strategy may include:

- budget
- timelines
- human resource requirements.

**Unit Sector(s)**

Not applicable.

**Competency field**

**Competency field**      Leadership

## **NWP704A Lead a project development**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required for the effective management of a complex project within the water industry. The ability to plan a project logically, control a project, manage risks and deliver quality outcomes is essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for managers and senior technical practitioners from a variety of disciplines and backgrounds who are applying their skills to the management of a function, team or division within the water organisation.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Plan the project.</b>	1.1 Clarify project brief with relevant personnel. 1.2 Identify and quantify human and financial resources to support management of project. 1.3 Assemble and brief project team. 1.4 Negotiate and finalise organisational requirements and procedures for management of project. 1.5 Identify and address <i>legislative requirements</i> relevant to project in the planning process. 1.6 Develop project goals, objectives and performance indicators in consultation with relevant personnel and stakeholders and follow organisational procedures. 1.7 <i>Plan project</i> according to organisational requirements and using appropriate <i>planning tools</i> .
<b>2 Manage the project.</b>	2.1 Communicate project plan to project team and clarify and allocate resourcing and accountabilities. 2.2 Monitor, record and report progress of project against milestones of project plan and according to organisational requirements. 2.3 Integrate range of tasks that comprise project to ensure efficient completion. 2.4 Consult stakeholders regarding progress of project and inform development. 2.5 Negotiate, record and communicate required changes to project plan. 2.6 Finalise project according to project plan and organisational procedures.
<b>3 Manage project risk.</b>	3.1 Identify potential risks to successful completion of project through extensive consultation with relevant stakeholders and personnel. 3.2 Analyse identified risks for likelihood of occurrence and their potential consequences. 3.3 Develop risk management or control plans to eliminate or reduce potential for risk events and consequences. 3.4 Review risk management or control plans periodically during life of the project and assess them for their adequacy, timeliness and effectiveness in risk mitigation.
<b>4 Deliver quality project outcomes.</b>	4.1 Identify and record quality requirements for successful completion of project and communicate them to project team members. 4.2 Identify and use quality management methods, techniques

## **ELEMENT**

## **PERFORMANCE CRITERIA**

and tools to support and manage project.

4.3 Assess outcomes of project for compliance with required quality standards.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- apply advanced project management skills
- apply quality management principles and techniques
- apply risk management principles and techniques
- use project management software and tools
- coordinate activities
- communicate effectively with a wide audience inside and outside the workplace
- plan effectively
- prepare a range of internal and external reports
- solve problems.

#### **Required knowledge:**

- technical and industry knowledge relevant to project being managed
- legislation relevant to project being managed
- project management, quality management and risk management techniques
- relevant industry trends, including emerging technologies
- infrastructure capacity and capacity planning
- organisational processes and reporting requirements.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to lead a complex project within the water industry including:

- managing a complex project and delivering required project outcomes
- effectively coordinating activities of project team members to deliver required outcomes
- preparing, monitoring and revising plans
- applying principles of quality and risk management to completion of project
- communicating with stakeholders.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition

## EVIDENCE GUIDE

(RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time

- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Legislative requirements*** may include:

- relevant federal legislation, including:
  - National Water Commission Act 2004
  - Environment Protection and Biodiversity Conservation Act 1999
- relevant state or territory legislation relating to water and resource management
- relevant state or territory legislation and regulations relating to OHS, including:
  - protective clothing and equipment
  - use of tools and equipment
  - workplace environment and safety
  - handling of materials
  - use of fire fighting equipment
  - use of first aid equipment
  - hazard control and hazardous materials and substances
- relevant local government by-laws
- relevant government and non-government policies and regulations such as:
  - National Water Initiative
  - Murray Darling Basin Water Agreement
- relevant community planning and development agreements, such as land care agreements.

***Plan project*** to address all facets of activity, which may include:

- budgets
- timelines
- human resource requirements
- project milestones
- project accountabilities
- project reporting processes and schedules
- contingency arrangements
- risk management requirements
- quality requirements.

***Planning tools*** used to

- may be:

## **RANGE STATEMENT**

support project:

- proprietary software packages
- commercial software packages
- may generate and track:
- project milestones
- resourcing lists
- staffing lists
- budgets.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Leadership

## **NWP705A Provide leadership in hydrometric network planning and water resource management**

### **Modification History**

Not applicable.

### **Unit Descriptor**

**Unit descriptor** This unit of competency describes the outcomes required to provide leadership to hydrometric network planning and water resource management. A detailed understanding of the processes required to collect, analyse, store and report data together with the use of this information to inform effective policy development are essential to performance.

### **Application of the Unit**

**Application of the unit** This unit supports the attainment of skills and knowledge required for senior hydrographers, senior field hydrologists and related senior staff.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Review and plan hydrometric network and data management processes.</b>	<ul style="list-style-type: none"><li>1.1 Review hydrometric network and water resource management planning and policy requirements of the organisation in consultation with senior management.</li><li>1.2 Review and analyse <i>data</i> required to support hydrometric network planning and water resource management processes within the organisation.</li><li>1.3 Review <i>processes to collect, analyse, store and report</i> hydrometric network data to ensure they support organisation's short, medium and long-term planning needs.</li><li>1.4 Identify, plan, manage and report resource requirements to meet hydrometric network data management needs of the organisation.</li><li>1.5 Identify future and extended uses of data and monitoring networks as part of planning process and to ensure most effective use of data and network.</li></ul>
<b>2 Manage provision of quality data.</b>	<ul style="list-style-type: none"><li>2.1 Communicate holistic purpose and eventual use of data to stakeholders and staff.</li><li>2.2 Review work procedures and documentation used to support collection, analysis, storage and reporting of hydrometric network data and communicate outcomes to staff.</li><li>2.3 Use advanced <i>mathematical and technical processes</i> to support planning and operation of hydrometric network monitoring and testing regimes.</li><li>2.4 Set monitoring and testing priorities.</li><li>2.5 Prepare reports in a format suitable to support decision-making and planning within organisation.</li><li>2.6 Plan and ensure appropriate and relevant training is provided to staff in specialist systems used in data management to ensure that a consistent approach to data collection, analysis and management occurs.</li></ul>
<b>3 Provide leadership in the effective management of water resources.</b>	<ul style="list-style-type: none"><li>3.1 Review and analyse role of hydrometric network data in development of water resource management policy within organisation, particularly in identifying deficiencies in networks.</li><li>3.2 Gather, review and communicate local, national and international information and best-practice policy regarding effective water resource management.</li><li>3.3 Analyse current, historical and trend data to inform organisation's short, medium and long-term water resource management planning.</li><li>3.4 Prepare clear and accurate reports according to</li></ul>

**ELEMENT**

**PERFORMANCE CRITERIA**

organisational procedures.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- collect and analyse hydrometric network and water resource management information sourced locally, nationally and internationally
- develop and manage budgets
- apply complex mathematical modelling and analytical tools
- interpret and prepare technical documentation regarding the collection, analysis and reporting of hydrometric data
- identify potential or actual operational problems
- undertake evidence-based short, medium and long-range planning
- communicate with employees, senior management, external industry experts and other stakeholders
- prepare complex reports
- use computer systems
- use communication systems
- give and receive instructions.

#### **Required knowledge:**

- relevant Australian standards, international guidelines and best practice systems applicable to nature and purpose of the monitoring network
- high-level hydrometric network and water resource management technical and planning information
- natural and constructed catchment processes that may affect hydrometric network data outputs, quality and eventual interpretation via modelling outputs and resource management and planning decisions
- physical and chemical interactions of resources under varying catchment and climatic conditions and impact on data interpretation and analysis
- mathematical techniques relevant to complex analysis and planning of hydrometric data
- sampling and testing procedures
- OHS legislation, risk management and procedures
- policies and standard operating procedures
- communication systems.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to provide leadership in hydrometric network planning and water resource management including:

- gathering, interpreting and applying complex documentation related to hydrometric network planning and water resource management processes of organisation
- reviewing and refining current practices used in collecting, analysing, storing and reporting hydrometric data
- planning and setting priorities for the management of hydrometric data collection, storage and reporting
- preparing clear and accurate reports
- contributing to development of short, medium and long-term water resource management planning within organisation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the

## EVIDENCE GUIDE

assessor has complete confidence in the person's competence over time and in various contexts

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

- Data*** required may include:
- local anecdotal data (verbal metadata)
  - survey data on stream sections, both cross and longitudinal
  - geographic information system (GIS) data
  - meteorological data
  - hydraulic analysis data
  - budgetary data
  - catchment water use datasets of actual resource use
  - discharge measurements
  - ratings tables
  - water licence entitlements datasets
  - time series data across data types.
- Processes to collect, analyse, store and report*** hydrometric network data may include:
- downloading, processing, editing, validating, quality-coding and archiving time series data
  - service agreements
  - procedures for establishing and managing ratings tables
  - data network audit tools, processes and software
  - high-level use of database software, including KISTERS and modelling
  - communication of hydrographic information to clients
  - budget development and management processes.
  - extending rating curves for monitoring sites
- Mathematical and technical processes*** may include:
- hydraulic analysis processes
  - physical and chemical interactions analysis
  - dataset extension techniques and processes
  - dataset interpolation techniques and processes
  - dataset creation techniques and processes, such as small ungauged catchments
  - estimating uncertainty of measurements or estimations
  - applying statistical tests to evaluate an existing ratings table

## **RANGE STATEMENT**

- using modelling or other processes to create synthesised data parameters based on accepted procedures or standards.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Leadership

# NWP706A Review and evaluate water and wastewater sustainability objectives

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to enable analysis and identification of solutions to issues such as the sustainable use of water, drinking water safety and quality, water recycling and the effectiveness of wastewater treatment. This requires the ability to be able to integrate technical and scientific knowledge of water conservation and recycling, power needs for different technology options, catchment management, domestic and industry requirements for different grades of water, and the environmental impact of various options chosen.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for senior managers, water treatment and resource planners and related senior staff.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.



## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Analyse water resource issues.	1.1 Analyse <i>economic</i> and <i>social issues</i> relevant to sustainable <i>water</i> use to determine implications for specific situations. 1.2 Identify and analyse <i>community attitudes</i> to use of recycled water for their impact on future initiatives. 1.3 Identify and analyse <i>legislation, regulations and policies</i> on <i>sustainability</i> and water recycling issues for relevance to specific situation. 1.4 Determine <i>water sustainability objectives</i> and targets for specific situation.
2 Determine treatment options for recycling.	2.1 Determine water catchment and groundwater protection and management principles for surface and groundwater sources, and recycled water. 2.2 Analyse hydrometric cycle and types and percentage of water use to determine sustainability of specific water resources. 2.3 Analyse impact of stormwater and industrial, agricultural, aquaculture and domestic water use on water quality. 2.4 Analyse <i>sustainability issues</i> and effect of reduced and more concentrated sewage flows for a specific situation. 2.5 Evaluate treatment options for recycling of treated wastewater and <i>alternative water sources</i> for their suitability in meeting quality standards for a <i>range of uses</i> .
3 Develop environmental strategies and targets.	3.1 Analyse designs of <i>model sustainable water systems</i> to determine their viability in specific situations. 3.2 Analyse costs and benefits of recycling schemes most appropriate to situation. 3.3 Evaluate existing and planned water recycling systems against <i>Australian and international benchmarks</i> . 3.4 Undertake risk assessment to determine strategies for managing hazards and risks. 3.5 Recommend integrated water resource planning to achieve water sustainability objectives and targets, with consideration of costs.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- perform complex research
- analyse technical information
- analyse financial information
- analyse trend data
- research and interpret social trends
- perform relevant statistical analysis
- identify potential or actual operational problems
- undertake evidence-based short, medium and long-range planning
- prepare complex reports
- use computer systems.

#### **Required knowledge:**

- political, economic and social aspects of water sustainability
- principles of cost benefit analysis
- concept of virtual water in agricultural and manufactured products
- legislative and regulatory requirements relevant to a sustainable water industry
- hydrometric cycle
- methods for evaluating risks to water quality, assets and services
- water sustainability issues and ecosystem quality
- recycling models and performance benchmarks
- water sustainability in domestic, industrial, agricultural and aquaculture contexts, including stormwater
- legislative and regulatory framework for water industry
- relevant Australian standards, international guidelines and best practice systems applicable to water sustainability.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to analyse and identify solutions to issues such as the sustainable use of water, drinking water safety and quality, water recycling and the effectiveness of wastewater treatment including:

- analysing complex technical, social and legislative issues affecting water sustainability
- determining water and wastewater treatment options
- researching and reviewing information and developing evidence-based recommendations for the development of relevant policies relating to environmental sustainability.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence

## EVIDENCE GUIDE

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Economic issues*** may include:

- costs and benefits of various options
- public and private ownership
- costing models
- increased costs of new developments.

***Social issues*** may include:

- land resumption
- cost of water supply
- damage to ecosystems
- equity issues
- political exploitation.

***Water*** includes:

- water in a watercourse, lake or spring
- underground water
- overland flow water
- water that has been collected in a dam
- wastewater of domestic, commercial, industrial or agricultural origin.

***Community attitudes*** may include:

- revulsion or fear of contamination
- fear of diseases
- resistance to change.

***Legislation, regulations and policies*** relevant to the State or Territory may include:

- Environmental Protection and Biodiversity Conservation Act 1999
- relevant state and territory environmental protection legislation
- relevant water legislation and regulations
- Australian Drinking Water Guidelines
- water recycling guidelines
- water quality guidelines
- National Water Quality Management Strategy.

***Sustainability*** may include:

- replenishment of resources
- maintaining resources
- assault on diminishing resource.

***Water and wastewater sustainability objectives***

- sustainable use of water
- drinking water safety
- water recycling

## **RANGE STATEMENT**

may include:

- long-term certainty of sources.

*Sustainability issues* may include:

- leakage
- evaporation
- sewer mining
- grey water use
- recycling
- intelligent use
- alternatives.

*Alternative water sources* may include:

- stormwater
- bore water
- brackish water
- process water.

*Range of uses* may include:

- irrigation
- aquaculture
- industry
- fire fighting
- recreation
- domestic
- replenishing raw surface water or groundwater resources.

*Model sustainable water systems* may include examples that are:

- specific to locations (e.g. Australia, Singapore, Israel and California)
- specific to industries (e.g. paper, cooling and food processing)
- existing or planned
- local and international.

*Australian and International benchmarks* may include:

- data from existing systems
- published research.

## **Unit Sector(s)**

Not applicable.

## Competency field

Competency field      Leadership



# NWP707A Analyse and review water treatment plant technology

## Modification History

Not applicable.

## Unit Descriptor

**Unit descriptor** This unit of competency describes the outcomes required to understand water quality and sustainability technology, and provide high-level advice on meeting legislative and regulatory requirements. A detailed understanding is required of the planning, design, testing and operation of advanced processes, incorporating new or novel technologies, together with the ability to identify problems and suggest viable cost-effective solutions within the constraints of legislation and regulations.

## Application of the Unit

**Application of the unit** This unit supports the attainment of skills and knowledge required for senior managers, water treatment and resource planners and related senior staff.

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit of competency contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge, and the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Analyse fundamentals of water science.	1.1 Analyse natural and engineered water cycles to establish their <i>components, features</i> and <i>variables</i> .
	1.2 Carry out <i>water testing</i> according to procedures in order to determine water and wastewater parameters, including nitrogen, phosphorus and microbiological indicators.
	1.3 Identify <i>substances commonly found in natural water sources</i> and analyse their <i>interactions</i> .
	1.4 Identify <i>substances commonly found in range of wastewater sources</i> and analyse their <i>environmental</i> and <i>epidemiological effects</i> .
	1.5 Identify <i>microbial species</i> found in water and wastewater and determine their activities and effects as <i>agents of disease</i> or <i>agents for removing organic matter</i> .
2 Determine design features of water treatment plants.	2.1 Determine purpose of <i>water treatment</i> and quality standards required in providing water for human consumption, industry, agriculture and aquaculture.
	2.2 Analyse fundamentals of <i>separation processes</i> to determine their role in water treatment.
	2.3 Research microbial metabolism systems and determine their role in removing organic and inorganic constituents of water.
	2.4 Analyse <i>input and output parameters</i> of water and wastewater treatment systems.
	2.5 Determine <i>fundamental features</i> of water and wastewater <i>reticulation systems</i> to establish their role and function in water treatment.
3 Analyse application of government legislation and policies to water industry.	3.1 Research <i>legislation and regulations</i> for Australian water industry to identify evolutionary framework and <i>forces of change</i> .
	3.2 Identify key principles and provisions of water-related legislation and regulations and analyse them for their impact on current practice.
	3.3 Analyse the Environment Protection Agency conditions for water and wastewater treatment plant licences, and Australian drinking water quality parameters to identify operational standards required.
	3.4 Identify changes required to meet legislative and regulatory requirements and communicate to relevant stakeholders.
4 Prepare strategic advice.	4.1 Synthesise and evaluate design, operation and management of water treatment plants and processes.
	4.2 Consult relevant personnel to inform the framing of policy

**ELEMENT**

**PERFORMANCE CRITERIA**

advice for the water organisation.

4.3 Prepare and present strategic advice on current and potential policies and procedures and the design, operation and management of water treatment plants and processes.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit.

#### **Required skills:**

- perform complex research
- analyse technical information
- use technology, including the internet, to access current legislative and regulatory requirements for water industry
- identify potential or actual operational problems
- undertake evidence-based short, medium and long-range planning
- communicate with employees, senior management, external industry experts and other stakeholders
- prepare complex reports
- use communication systems
- give and receive instructions.

#### **Required knowledge:**

- fundamental aspects of physics, chemistry, biology and microbiology relevant to water and wastewater treatment and requisite laboratory skills
- water sources and resources relevant to water and wastewater treatment
- substances in natural water sources and their interactions
- environmental and epidemiological effects of substances found in wastewater sources
- microbial species and effects
- purposes of water treatment
- fundamentals of separation processes and disinfection
- microbial metabolism
- input and output parameters of treatment systems
- reticulation systems and hydraulic modelling
- legislative and regulatory framework for water industry
- Environment Protection Authority requirements for treatment plant licenses and drinking water
- OHS legislation, risk management and procedures
- relevant water treatment policies and procedures
- communication systems
- relevant Australian standards, international guidelines and best practice systems applicable to water treatment plants and plant technologies.

## 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, the range statement and the Assessment Guidelines for the Training Package.

#### **Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The candidate should demonstrate the ability to understand water quality and sustainability technology, and provide high-level advice on meeting legislative and regulator requirements including:

- analysing and applying principles of water science
- analysing and applying principles associated with design of water treatment plants and processes
- reviewing and refining current practices associated with water treatment plant technologies
- preparing clear and accurate reports
- contributing to development of water treatment planning within organisation.

#### **Context of and specific resources for assessment**

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards and government regulations.

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

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
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect

## EVIDENCE GUIDE

and supplementary evidence

- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit.

Questioning will be undertaken in a manner appropriate to the skill levels of the operator and cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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. Add any 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.

***Components*** may include:

- natural water cycles, including:
  - rivers and lakes
  - artesian and aquifers
  - brackish and salt water
  - stormwater
- engineered water cycles, including:
  - reticulation systems
  - dams
  - collection systems
  - bores and wells.

***Features*** may include:

- natural water cycles:
  - rainfall patterns
  - size and protection
  - retention time in catchment
  - evaporation rate
  - types of source:
    - bore
    - river
    - dam
  - engineered water cycles
  - type of user:
    - domestic
    - industrial
    - aquaculture
    - agriculture
  - type of water or wastewater treatment system:
    - urban
    - non-urban
  - length and volume of collection and reticulation system.

***Variables*** may include:

- natural water cycles, including:
  - rainfall
  - temperature



## RANGE STATEMENT

- pH, hardness and alkalinity
  - taste, odour, colour and turbidity
  - nature and quantity of total dissolved and suspended matter
  - dissolved oxygen
  - engineered water cycles, including:
    - flow rates
    - industrial and agricultural uses and inputs
    - input and output parameters
    - availability and uses of recycling.
- Water testing*** may include:
- pH, chlorine, suspended solids and dissolved oxygen
  - alkalinity and volatile acids
  - mixed liquor suspended solids
  - mixed liquor volatile suspended solids
  - colour, turbidity and conductivity
  - biological oxygen demand (BOD) and chemical oxygen demand (COD), total organic carbon (TOC), phosphorus (P), nitrogen (N), other ions and organic compounds
  - identification and enumeration of bacteria, cyanobacteria and protozoa.
- Substances commonly found in natural water sources*** may include:
- metal ions
  - salts
  - N and P
  - microorganisms and algae
  - organic and inorganic compounds producing colour, turbidity, odour or taste
  - radiation emitters.
- Interactions*** may include:
- oxidation of metal ions
  - settling of suspended matter
  - ultraviolet destruction of microorganisms
  - growth of nuisance organisms, such as cyanobacteria.
- Substances commonly found in range of wastewater sources*** may include:
- toxins
  - metals
  - domestic or industrial organic matter
  - other dissolved and suspended solids
  - toxic, flammable and asphyxiating gases
  - disinfection by-products.
- Range of wastewater sources*** may include:
- domestic
  - industry
  - aquaculture

## RANGE STATEMENT

- agriculture
- stormwater.
- serious:
- material environmental harm to air, water or land
- nuisance environmental harm.
- faecal-oral route of infection
- infection and transmission of infectious agents
- effects of biological, chemical or physical toxins on animals and plants.
- E. Coli
- salmonella
- campylobacter
- Shigella
- Yersinia
- protozoa
- adenovirus
- enterovirus
- hepatitis virus.
- bacteria
- viruses
- protozoa
- microbial toxins
- chemical toxins.
- aerobic bacteria
- facultative bacteria
- anaerobic bacteria.
- coagulation
- flocculation
- sedimentation
- filtration
- disinfection
- natural systems
- designed wetlands
- lagoons
- Imhoff tanks
- small septic tanks
- bio-filters
- contactors
- activated sludge processes

*Environmental effects* may include:

*Epidemiological effects* may include:

*Microbial species* may include:

*Agents of disease* may include:

*Agents for removing organic matter* may include:

*Water treatment* may include:

## RANGE STATEMENT

*Separation processes* may include:

- special treatment processes.
- filtration
- presses
- centrifuges
- sedimentation
- gravity settling
- flocculation
- chemically assisted processes.

*Input and output parameters* may include:

- Biological Oxygen Demand and Chemical Oxygen Demand
- suspended solids
- biomass as mixed liquor suspended solids (MLSS) or mixed liquor volatile suspended solids (MLVSS)
- pH
- dissolved oxygen (DO)
- N, P and other chemical species
- toxins
- chlorine
- faecal coliforms, such as E. Coli
- colour
- turbidity.

*Fundamental features* may include:

- pipe networks
- gravity and pressure systems
- pumps and pump wells
- reservoirs
- residual disinfection
- oxygenation
- hydraulic modelling
- leak detection
- leak prevention.

*Reticulation systems* may include:

- sewage collection systems
- water distribution systems.

*Legislation and regulations* relevant to the State or Territory may include:

- Environmental Protection and Biodiversity Conservation Act 1999
- relevant state and territory environmental protection legislation
- relevant water legislation and regulations
- Australian Drinking Water Guidelines
- Water recycling guidelines
- Water quality guidelines

## **RANGE STATEMENT**

*Forces of change* may include:

- National Water Quality Management Strategy.
- community expectations
- availability of technology
- climatic change
- diminishing fresh water sources.

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field**      Leadership

## BSBFIM501A Manage budgets and financial plans

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit describes the performance outcomes, skills and knowledge required to undertake financial management within a work team in an organisation. This includes planning and implementing financial management approaches, supporting team members whose role involves aspects of financial operations, monitoring and controlling finances, and reviewing and evaluating effectiveness of financial management processes in line with the financial objectives of the work team and the organisation.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit addresses the requirement for managers to ensure that financial resources are used effectively. This is done by ensuring access to budget/s and ongoing monitoring expenditure against the budget/s.</p> <p>The unit applies to managers working in small and large business environments and not for profit organisations.</p>
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### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

<b>Prerequisite units</b>		

<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
1. Plan financial management approaches	1.1. Access <b><i>budget/financial plans</i></b> for the work team 1.2. Clarify budget/financial plans with <b><i>relevant personnel</i></b> within the organisation to ensure that documented outcomes are achievable, accurate and comprehensible 1.3. Negotiate any changes required to be made to budget/financial plans with relevant personnel within the organisation 1.4. Prepare <b><i>contingency plans</i></b> in the event that initial plans need to be varied
2. Implement financial management approaches	2.1. Disseminate relevant details of the agreed budget/financial plans to team members 2.2. Provide <b><i>support</i></b> to ensure that team members can competently perform <b><i>required roles</i></b> associated with the management of finances 2.3. Determine and access <b><i>resources and systems</i></b> to manage financial management processes within the work team
3. Monitor and control finances	3.1. Implement <b><i>processes</i></b> to monitor actual expenditure and to control costs across the work team 3.2. Monitor expenditure and costs on an agreed cyclical basis to identify cost variations and expenditure overruns 3.3. Implement, monitor and modify contingency plans as required to maintain financial objectives 3.4. <b><i>Report</i></b> on budget and expenditure in accordance with organisational protocols
4. Review and evaluate financial management processes	4.1. Collect and collate for analysis, <b><i>data and information on the effectiveness of financial management processes</i></b> within the work team 4.2. Analyse data and information on the effectiveness of financial management processes within the work team and identify, document and recommend any improvements to existing processes 4.3. Implement and monitor agreed improvements in line with financial objectives of the work team and the organisation

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- numeracy skills to read and understand a budget and to update a budget
- technology skills to use software associated with financial record keeping.

#### Required knowledge

- basic accounting principles
- organisational requirements related to financial management
- relevant legislation and current requirements of the Australian Taxation Office, including GST
- requirements for organisational record keeping and auditing
- principles and techniques involved in:
  - budgeting
  - cash flows
  - electronic spreadsheets
  - GST
  - ledgers and financial statements
  - profit and loss statements.



## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> <li>financial skills required to work with and interpret budgets, ageing summaries, cash flow, petty cash, GST, and profit and loss statements</li> <li>knowledge of the record keeping requirements for the ATO and for auditing purposes.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>access to appropriate documentation and resources normally used in the workplace.</li> </ul>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>assessment of written reports indicating broad knowledge of managing budgets and managing financial resources in the organisation</li> <li>demonstration of techniques using financial record keeping software</li> <li>direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate</li> <li>oral or written questioning to assess knowledge of requirements for organisational record keeping and auditing</li> <li>review of contingency plans</li> <li>review of identification of cost variations and expenditure overruns</li> <li>evaluation of documentation reporting on budget and expenditure</li> <li>review of documentation identifying and recommending improvements to financial management processes.</li> </ul>
<b>Guidance information for assessment</b>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p>

**EVIDENCE GUIDE**

- other units from the Diploma of Management.

## Range Statement

### 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.

<p><b><i>Budget/financial plans</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• cash flow projections</li> <li>• long-term budgets/plans</li> <li>• operational plans</li> <li>• short-term budgets/plans</li> <li>• spreadsheet-based financial projections</li> <li>• targets or key performance indicators for production, productivity, wastage, sales, income and expenditure</li> </ul>
<p><b><i>Relevant personnel</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• financial managers, accountants or financial controllers</li> <li>• supervisors, other frontline managers</li> </ul>
<p><b><i>Contingency plans</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• contracting out or outsourcing human resources and other functions or tasks</li> <li>• diversification of outcomes</li> <li>• finding cheaper or lower quality raw materials and consumables</li> <li>• increasing sales or production</li> <li>• recycling and re-using</li> <li>• rental, hire purchase or alternative means of procurement of required materials, equipment and stock</li> <li>• restructuring of organisation to reduce labour costs</li> <li>• risk identification, assessment and management processes</li> <li>• seeking further funding</li> <li>• strategies for reducing costs, wastage, stock or consumables</li> <li>• succession planning</li> </ul>
<p><b><i>Support</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• access to specialist advice</li> <li>• documentation of procedures</li> <li>• help desk or identified experts within the organisation</li> <li>• information briefings or sessions</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• intranet-based information</li> <li>• training including mentoring, coaching and shadowing</li> </ul>
<b>Required roles</b> may include:	<ul style="list-style-type: none"> <li>• arranging for use of corporate credit cards</li> <li>• banking</li> <li>• debt collection</li> <li>• ensuring security, accuracy and currency of financial operations</li> <li>• invoicing clients, customers and consumers</li> <li>• maintaining journals, ledgers and other record keeping systems</li> <li>• maintaining petty cash system</li> <li>• purchasing and procurement</li> <li>• wages and salaries payments and record keeping</li> </ul>
<b>Resources and systems</b> may include:	<ul style="list-style-type: none"> <li>• hardware and software</li> <li>• human, physical or financial resources</li> <li>• record keeping systems (electronic and paper-based)</li> <li>• specialist advice or support</li> </ul>
<b>Processes</b> to monitor actual expenditure and to control costs across the work team include:	<ul style="list-style-type: none"> <li>• reporting of: <ul style="list-style-type: none"> <li>• assets</li> <li>• consumables</li> <li>• equipment</li> <li>• expenditure</li> <li>• income</li> <li>• stock</li> <li>• wastage</li> </ul> </li> </ul>
<b>Reporting</b> may include data from:	<ul style="list-style-type: none"> <li>• bank statements</li> <li>• credit card statements</li> <li>• financial reports</li> <li>• invoices and receipts</li> <li>• ledgers and journals</li> <li>• logs</li> <li>• petty cash records</li> <li>• spreadsheet-based records</li> </ul>
<b>Data and information on the effectiveness of financial management processes</b> may include records (paper-based and	<ul style="list-style-type: none"> <li>• bank account records</li> <li>• cash flow data</li> <li>• contracts</li> </ul>

**RANGE STATEMENT**

electronic) related to:

- credit card receipts
- employee timesheets
- files of paid purchase and service invoices
- income and expenditure
- insurance reports
- invoices
- job costings
- petty cash receipts
- quotations
- taxation records
- wages/salaries books

**Unit Sector(s)**

<b>Unit sector</b>	
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**Competency field**

<b>Competency field</b>	Management and Leadership - Management
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**Co-requisite units**

<b>Co-requisite units</b>	

## BSBITU201A Produce simple word processed documents

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit describes the performance outcomes, skills and knowledge required to correctly operate word processing applications in the production of workplace documents.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to individuals who perform a range of routine tasks in the workplace, using a limited range of practical skills and fundamental knowledge of word processing and software in a defined context, under direct supervision or with limited individual responsibility.</p>
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### Licensing/Regulatory Information

Not applicable.

### 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
1. Prepare to produce documents	1.1. Use safe work practices to ensure <i>ergonomic, work organisation</i> , energy and resource <i>conservation requirements</i> are addressed 1.2. Identify <i>document</i> purpose, audience and presentation requirements, and clarify with relevant personnel as required 1.3. Identify <i>organisational</i> and task <i>requirements</i> for document layout and design
2. Produce documents	2.1. <i>Format</i> document using appropriate <i>software functions</i> to adjust page layout to meet information requirements, in accordance with organisational style and presentation requirements 2.2. Use system features to identify and manipulate <i>screen display options and controls</i> 2.3. Use manuals, user documentation and online help to overcome problems with document presentation and production
3. Finalise documents	3.1. Ensure final document is previewed, <i>checked</i> , adjusted and <i>printed</i> in accordance with organisational and task requirements 3.2. Ensure document is prepared within <i>designated time lines</i> and organisational requirements 3.3. <i>Name and store document</i> in accordance with organisational requirements and exit application without information loss/damage



## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- communication skills to clarify document requirements
- editing and proofreading skills to check own work for accuracy
- keyboarding skills to enter text and numerical data
- literacy skills to read and understand organisation's procedures, and to use basic models to produce a range of correspondence
- problem-solving skills to solve routine problems.

#### Required knowledge

- formatting styles and their effect on formatting, readability and appearance of documents
- purpose, use and function of word processing software
- organisational requirements for ergonomics, work periods and breaks, and conservation techniques
- organisational style guide.

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> <li>• knowledge of simple word processing functions, standard document layout and design principles</li> <li>• production of a minimum of three simple, word processed documents.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>• access to an actual workplace or simulated environment</li> <li>• access to office equipment and resources</li> <li>• access to examples of word processed documents and style guides.</li> </ul>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>• direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate</li> <li>• review of formatted document</li> <li>• review of final document</li> <li>• demonstration of techniques</li> <li>• oral or written questioning to assess knowledge of word processing software functions.</li> </ul>
<b>Guidance information for assessment</b>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>• general administration units</li> <li>• other IT use units.</li> </ul>

## Range Statement

<b>RANGE STATEMENT</b>	
<p>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.</p>	
<p><b><i>Ergonomic requirements</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• avoiding radiation from computer screens</li> <li>• chair height, seat and back adjustment</li> <li>• document holder</li> <li>• footrest</li> <li>• keyboard and mouse position</li> <li>• lighting</li> <li>• noise minimisation</li> <li>• posture</li> <li>• screen position</li> <li>• workstation height and layout</li> </ul>
<p><b><i>Work organisation requirements</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• exercise breaks</li> <li>• mix of repetitive and other activities</li> <li>• rest periods</li> </ul>
<p><b><i>Conservation requirements</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• disposing of non-confidential waste paper in recycling bins</li> <li>• double-sided paper use</li> <li>• re-using paper for rough drafts (observing confidentiality requirements)</li> <li>• utilising power-save options for equipment</li> </ul>
<p><b><i>Documents</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• agendas</li> <li>• briefing papers</li> <li>• envelopes</li> <li>• faxes</li> <li>• labels</li> <li>• letters</li> <li>• mail merges</li> <li>• memos</li> <li>• minutes</li> <li>• short reports</li> <li>• simple one-page flyers</li> <li>• standard form letters</li> </ul>
<p><b><i>Organisational requirements</i></b> may</p>	<ul style="list-style-type: none"> <li>• company colour scheme</li> </ul>

<b>RANGE STATEMENT</b>	
include:	<ul style="list-style-type: none"> <li>• company logo</li> <li>• consistent corporate image</li> <li>• content restrictions</li> <li>• established guidelines and procedures for document production</li> <li>• house styles</li> <li>• observing copyright legislation</li> <li>• organisation name, time, date, document title, filename etc. in header/footer</li> <li>• templates</li> </ul>
<i>Formatting</i> may include:	<ul style="list-style-type: none"> <li>• alignment on page</li> <li>• columns</li> <li>• company logo/letterhead</li> <li>• enhancements to format - borders, patterns and colours</li> <li>• enhancements to text - colour, size, orientation</li> <li>• headers/footers</li> <li>• margins</li> <li>• page orientation</li> </ul>
<i>Software functions</i> may include:	<ul style="list-style-type: none"> <li>• default settings</li> <li>• document protection</li> <li>• grammar check</li> <li>• headers/footers</li> <li>• indent</li> <li>• line spacing</li> <li>• page numbers</li> <li>• page set up</li> <li>• paragraph formatting</li> <li>• spell check</li> <li>• tabs</li> <li>• text formatting</li> </ul>
<i>Screen display options and controls</i> may include:	<ul style="list-style-type: none"> <li>• layout view</li> <li>• maximise/minimise</li> <li>• normal view</li> <li>• page view</li> <li>• print preview</li> <li>• ruler</li> <li>• toolbars</li> <li>• zoom percentage</li> </ul>

<b>RANGE STATEMENT</b>	
<i>Checking</i> may include:	<ul style="list-style-type: none"> <li>• accuracy of information</li> <li>• consistency of layout</li> <li>• ensuring instructions with regard to content and format have been followed</li> <li>• grammar</li> <li>• proofreading</li> <li>• spelling, electronically and manually</li> </ul>
<i>Printing</i> may include:	<ul style="list-style-type: none"> <li>• basic print settings</li> <li>• multiple copies</li> <li>• odd or even pages</li> <li>• print preview</li> <li>• printer setup</li> <li>• specified pages</li> <li>• whole document</li> </ul>
<i>Designated time lines</i> may include:	<ul style="list-style-type: none"> <li>• organisational time line e.g. deadline requirements</li> <li>• time line agreed with internal/external client</li> <li>• time line agreed with supervisor/person requiring document/s</li> </ul>
<i>Naming and storing documents</i> may include:	<ul style="list-style-type: none"> <li>• appropriate file type</li> <li>• authorised access</li> <li>• file names according to organisational procedure e.g. numbers rather than names</li> <li>• file names which are easily identifiable in relation to the content</li> <li>• file/directory names which identify the operator, author, section, date etc.</li> <li>• filing locations</li> <li>• organisational policy for backing up files</li> <li>• organisational policy for filing hard copies of documents</li> <li>• security</li> <li>• storage in folders/sub-folders</li> <li>• storage on hard/floppy disk drives, CD-ROM, tape back-up</li> </ul>

## Unit Sector(s)

<b>Unit sector</b>	
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### Competency field

<b>Competency field</b>	Information and Communications Technology - IT Use
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### Co-requisite units

<b>Co-requisite units</b>		

## BSBITU202A Create and use spreadsheets

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit describes the performance outcomes, skills and knowledge required to correctly create and use spreadsheets and charts through the use of spreadsheet software.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to individuals who perform a range of routine tasks in the workplace using a limited range of practical skills and fundamental knowledge of creating spreadsheets in a defined context under direct supervision or with limited individual responsibility.</p>
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### Licensing/Regulatory Information

Not applicable.

### 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
1. Select and prepare resources	1.1. Adjust workspace, furniture and equipment to suit user <i>ergonomic, work organisation</i> and occupational health and safety (OHS) <i>requirements</i> 1.2. Use energy and resource <i>conservation techniques</i> to minimise wastage in accordance with organisational and statutory requirements 1.3. Identify <i>spreadsheet task requirements</i> and clarify with relevant personnel as required
2. Create simple spreadsheets	2.1. Ensure <i>data</i> is entered, <i>checked</i> and amended in accordance with organisational and task requirements, to maintain consistency of design and layout 2.2. <i>Format</i> spreadsheet using <i>software functions</i> , to adjust page and cell layout to meet information requirements, in accordance with organisational style and presentation requirements 2.3. Ensure <i>formulae</i> are used and tested to confirm output meets task requirements, in consultation with appropriate personnel as required 2.4. Use manuals, user documentation and online help to overcome problems with spreadsheet design and production
3. Produce simple charts	3.1. Select <i>chart type</i> and design that enables valid representation of numerical data and meets organisational and task requirements 3.2. Create chart using appropriate data range in the spreadsheet 3.3. Modify chart type and layout using formatting <i>features</i>
4. Finalise spreadsheets	4.1. Ensure spreadsheet and any accompanying charts are previewed, adjusted and <i>printed</i> in accordance with organisational and task requirements 4.2. Ensure data input meets <i>designated time lines</i> and organisational requirements for speed and accuracy 4.3. Name and <i>store</i> spreadsheet in accordance with organisational requirements and exit the application without data loss/damage

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- communication skills to clarify requirements of spreadsheet
- editing and proofreading skills to check own work for accuracy
- keyboarding skills to enter text and numerical data
- literacy skills to read and understand organisation's procedures, and to use basic models to produce a range of spreadsheets
- numeracy skills to create and use spreadsheet formulae.

#### Required knowledge

- formatting of workplace documents
- organisational requirements for ergonomic standards, work periods and breaks, and conservation techniques
- organisational guidelines on spreadsheet manipulation and processing
- purpose and range of use of spreadsheet functions.

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> <li>designing a minimum of two spreadsheets</li> <li>using cell-based formulae</li> <li>creating charts using relevant data</li> <li>knowledge of purpose and range of use of spreadsheet functions.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>access to an actual workplace or simulated environment</li> <li>access to office equipment and resources</li> <li>access to examples of spreadsheets and simple formulae.</li> </ul>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate</li> <li>review of final spreadsheets</li> <li>analysis of responses to case studies and scenarios</li> <li>demonstration of techniques</li> <li>oral or written questioning to assess knowledge of spreadsheet software functions.</li> </ul>
<b>Guidance information for assessment</b>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>general administration units</li> <li>other IT use units.</li> </ul>

## Range Statement

### 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.

<i><b>Ergonomic requirements</b></i> may include:	<ul style="list-style-type: none"> <li>• avoiding radiation from computer screens</li> <li>• chair height, seat and back adjustment</li> <li>• document holder</li> <li>• footrest</li> <li>• keyboard and mouse position</li> <li>• lighting</li> <li>• noise minimisation</li> <li>• posture</li> <li>• screen position</li> <li>• workstation height and layout</li> </ul>
<i><b>Work organisation requirements</b></i> may include:	<ul style="list-style-type: none"> <li>• exercise breaks</li> <li>• mix of repetitive and other activities</li> <li>• rest periods</li> </ul>
<i><b>Conservation techniques</b></i> may include:	<ul style="list-style-type: none"> <li>• double-sided paper use</li> <li>• recycling used and shredded paper</li> <li>• re-using paper for rough drafts (observing confidentiality requirements)</li> <li>• utilising power-save options for equipment</li> </ul>
<i><b>Spreadsheet task requirements</b></i> may include:	<ul style="list-style-type: none"> <li>• data entry</li> <li>• output</li> <li>• presentation</li> <li>• storage</li> </ul>
<i><b>Data</b></i> may include:	<ul style="list-style-type: none"> <li>• numbers</li> <li>• text</li> </ul>
<i><b>Checking</b></i> may include:	<ul style="list-style-type: none"> <li>• accuracy of data</li> <li>• accuracy of formulae with calculator</li> <li>• ensuring instructions with regard to content and format have been followed</li> <li>• proofreading</li> <li>• spelling, electronically and manually</li> </ul>
<i><b>Formatting</b></i> may include:	<ul style="list-style-type: none"> <li>• alignment on page</li> <li>• efficiency of formulae</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• enhancements to format - borders, patterns and colours</li> <li>• enhancements to text</li> <li>• headers/footers</li> <li>• use of absolute and relative cell addresses</li> <li>• use of cell addresses in formulae</li> </ul>
<i>Software functions</i> may include:	<ul style="list-style-type: none"> <li>• adding/deleting columns/rows</li> <li>• formatting cells</li> <li>• formatting text</li> <li>• headers/footers</li> <li>• sizing columns/rows</li> </ul>
<i>Formulae</i> may include:	<ul style="list-style-type: none"> <li>• absolute cell referencing and/or mixed references</li> <li>• average</li> <li>• division</li> <li>• maximum</li> <li>• minimum</li> <li>• multiplication</li> <li>• subtraction</li> <li>• sum</li> <li>• combinations of above</li> </ul>
<i>Chart types</i> may include:	<ul style="list-style-type: none"> <li>• area</li> <li>• bar</li> <li>• column</li> <li>• exploded pie</li> <li>• line</li> <li>• pie and 3-D pie</li> <li>• scatter/bubble</li> <li>• stacked/multiple bar</li> <li>• stacked, 3-D column</li> </ul>
<i>Features</i> may include:	<ul style="list-style-type: none"> <li>• axes</li> <li>• axis title</li> <li>• borders</li> <li>• chart title</li> <li>• colours</li> <li>• data labels</li> <li>• data tables</li> <li>• fills</li> <li>• gridlines</li> <li>• legend</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• lines</li> <li>• patterns</li> </ul>
<i>Printing</i> may include:	<ul style="list-style-type: none"> <li>• fit on one page</li> <li>• fit specific number of pages</li> <li>• with formulae</li> <li>• with values</li> </ul>
<i>Designated time lines</i> may include:	<ul style="list-style-type: none"> <li>• organisational time line e.g. financial requirements</li> <li>• time line agreed with internal/external client</li> <li>• time line agreed with supervisor/person requiring spreadsheet</li> </ul>
<i>Storing</i> data may include:	<ul style="list-style-type: none"> <li>• authorised access</li> <li>• filing locations</li> <li>• organisational policy for backing up files</li> <li>• organisational policy for filing hard copies of spreadsheets</li> <li>• security</li> <li>• storage in electronic folders/sub-folders</li> <li>• storage on CD-ROM, zip drives, USB memory</li> </ul>

### Unit Sector(s)

<b>Unit sector</b>	
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### Competency field

<b>Competency field</b>	Information and Communications Technology - IT Use
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### Co-requisite units

<b>Co-requisite units</b>	



## BSBLED101A Plan skills development

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit describes the performance outcomes, skills and knowledge required to identify and document current skills and to plan future skills development under the guidance of an appropriate adviser.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to individuals developing basic skills and knowledge of career planning and skills development in preparation for working in a broad range of settings.</p>
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### Licensing/Regulatory Information

Not applicable.

### 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
1. Seek advice on future career directions	1.1. Identify possible career directions in industry or organisation 1.2. Identify and prioritise personal work goals 1.3. Discuss future work/career directions with <i>appropriate people</i> and identify additional skills requirements 1.4. Take into account personal values and attitudes regarding work and business, in planning future work/career directions 1.5. Identify additional skills required and determine appropriate <i>method/s</i> to acquire these skills
2. Conduct self assessment of skills	2.1. Identify work, life and study <i>experiences relating to business</i> 2.2. Assess current skills, knowledge and attitudes against a <i>checklist</i> of <i>relevant competencies</i> 2.3. Discuss results of self-assessment with trainer or assessor 2.4. Identify further skills development needs
3. Prepare portfolio of evidence	3.1. Identify and discuss <i>types of evidence</i> required 3.2. Develop a clear understanding of the <i>purpose of evidence</i> 3.3. Collect examples of evidence for portfolio 3.4. Complete application for recognition of current competency and/or <i>personal resume</i> with assistance from assessor

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- literacy and communication skills to access information to identify career options and personal work goals, and to draft a portfolio of evidence
- problem-solving skills to solve routine problems related to the workplace, under direct supervision
- technology skills to use business equipment, under direction.

#### Required knowledge

- importance of skills development in career planning terms
- sources of advice on career planning and skill development
- types of evidence and ways of creating portfolios of evidence.

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> <li>• documentation of personal strengths and areas for future skill development</li> <li>• documentation of proposed career plan</li> <li>• evidence of current competencies</li> <li>• knowledge of the importance of skills development in career planning terms.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>• access to an actual workplace or simulated environment</li> <li>• access to office equipment and resources</li> <li>• examples of resumes and career planning resources.</li> </ul>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>• direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate</li> <li>• review of prioritisation of personal work goals</li> <li>• analysis of responses to case studies and scenarios</li> <li>• observation of presentations</li> <li>• oral or written questioning to assess knowledge of types of evidence and ways of creating portfolios of evidence</li> <li>• review of documentation identifying further skills development needs</li> <li>• analysis of portfolio.</li> </ul>
<b>Guidance information for assessment</b>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>• other learning and development units.</li> </ul>

## Range Statement

### 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.

<b><i>Appropriate people</i></b> may include	<ul style="list-style-type: none"> <li>• assessors</li> <li>• colleagues</li> <li>• mentors</li> <li>• supervisors</li> <li>• trainers</li> </ul>
<b><i>Method/s</i></b> to acquire additional skills may include:	<ul style="list-style-type: none"> <li>• attendance at workshop or demonstration</li> <li>• formal course participation</li> <li>• on-the-job coaching or mentoring</li> <li>• work experience</li> </ul>
<b><i>Experiences relating to business</i></b> may include:	<ul style="list-style-type: none"> <li>• family responsibilities</li> <li>• study including formal or informal learning</li> <li>• volunteer or recreational experience</li> <li>• work experience</li> </ul>
<b><i>Checklist</i></b> may include:	<ul style="list-style-type: none"> <li>• personal skills and attributes</li> <li>• practical skills</li> <li>• strengths and weaknesses</li> </ul>
<b><i>Relevant competencies</i></b> may include:	<ul style="list-style-type: none"> <li>• academic results</li> <li>• interpersonal skills</li> <li>• organisation skills</li> <li>• personal attributes</li> <li>• personal skills e.g. demonstrated leadership, team work</li> <li>• practical skills directly related to a workplace</li> </ul>
<b><i>Types of evidence</i></b> may include:	<ul style="list-style-type: none"> <li>• academic results including informal studies</li> <li>• personal interests and experiences</li> <li>• previous employment</li> <li>• recreational experiences</li> <li>• volunteer work</li> <li>• work experience</li> </ul>
<b><i>Purpose of evidence</i></b> may include:	<ul style="list-style-type: none"> <li>• assessment of current competencies</li> <li>• building a picture of personal attributes</li> <li>• documentation of competencies relevant to the</li> </ul>

<b>RANGE STATEMENT</b>	
	workplace <ul style="list-style-type: none"> <li>• identification of areas for further skill development</li> <li>• identification of strengths and weaknesses</li> </ul>
<i>Personal resume</i> may include:	<ul style="list-style-type: none"> <li>• contact details</li> <li>• education and extra curricular activities</li> <li>• past employment and/or volunteer work</li> <li>• personal attributes, skills, strengths</li> <li>• professional development i.e. formal or informal courses undertaken</li> <li>• work experience</li> <li>• work related or personal references</li> </ul>

### Unit Sector(s)

<b>Unit sector</b>	
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### Competency field

<b>Competency field</b>	Workforce Development - Learning and Development
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### Co-requisite units

<b>Co-requisite units</b>		

## BSBMGT402A Implement operational plan

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit describes the performance outcomes, skills and knowledge required to implement the operational plan by monitoring and adjusting operational performance, producing short term plans for the department/section, planning and acquiring resources and providing reports on performance as required.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>Frontline managers are actively engaged in planning activities to achieve the measurable, stated objectives of the team and the organisation. This key role is carried out to provide safe, efficient and effective products and services to customer satisfaction within the organisation's productivity and profitability plans.</p> <p>At this level, work will normally be carried out within routine and non routine methods and procedures, which require planning, evaluation, leadership and guidance of others.</p>
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### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

<b>Prerequisite units</b>	

<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
1. Implement operational plan	<p>1.1. Collate, analyse and organise details of <b>resource requirements</b> in consultation with <b>relevant personnel, colleagues and specialist resource managers</b></p> <p>1.2. Implement <b>operational plans</b> to contribute to the achievement of organisation's performance/business plan</p> <p>1.3. Identify and use <b>key performance indicators</b> (KPIs) to monitor operational performance</p> <p>1.4. Undertake <b>contingency planning</b> and <b>consultation processes</b></p> <p>1.5. Provide assistance in the development and presentation of proposals for resource requirements in line with operational planning processes</p>
2. Implement resource acquisition	<p>2.1. Recruit and induct employees within <b>organisation's policies, practices and procedures</b></p> <p>2.2. Implement plans for acquisition of physical resources and services within organisation's policies, practices and procedures and in consultation with relevant personnel</p>
3. Monitor operational performance	<p>3.1. Monitor <b>performance systems and processes</b> to assess progress in achieving profit/productivity plans and targets</p> <p>3.2. Analyse and use budget and actual financial information to monitor profit/productivity performance</p> <p>3.3. Identify unsatisfactory performance and take prompt action to rectify the situation according to organisational policies</p> <p>3.4. Provide mentoring, coaching and supervision to support individuals and teams to use resources effectively, economically and safely</p> <p>3.5. Present recommendations for variation to operational plans to the <b>designated persons/groups</b> and gain approval</p> <p>3.6. Implement <b>systems, procedures and records</b> associated with performance in accordance with organisation's requirements</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- coaching and mentoring skills to provide support to colleagues
- literacy skills to access and use workplace information, and to prepare reports
- planning and organising skills to monitor performance and to sequence work of self and others to achieve planned outcomes.

#### Required knowledge

- principles and techniques associated with:
  - contingency planning
  - methods for monitoring and reporting on performance
  - monitoring and implementing operations and procedures
  - problem identification and methods of resolution
  - relevant budgeting and financial analysis, interpretation and reporting requirements
  - resource management systems at the tactical implementation level
  - resource planning and acquisition
  - tactical risk analysis including identification and reporting requirements.

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> <li>ability to monitor and adjust operational performance, produce short-term plans for the department or section, plan and acquire resources, and provide reports on performance as required</li> <li>knowledge of principles and techniques associated with monitoring and implementing operations and procedures.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>access to appropriate documentation and resources normally used in the workplace.</li> </ul>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate</li> <li>review of documentation outlining contingency planning and consultation processes undertaken</li> <li>demonstration of techniques in managing performance</li> <li>evaluation of mentoring, coaching and supervision provided to support individuals and teams to use resources effectively, economically and safely.</li> </ul>
<b>Guidance information for assessment</b>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>other units from the Certificate IV in Frontline Management.</li> </ul>

## Range Statement

### 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.

<p><b><i>Resource requirements</i></b> may refer to:</p>	<ul style="list-style-type: none"> <li>• goods and services to be purchased and ordered</li> <li>• human, physical and financial resources - both current and projected</li> <li>• stock requirements and requisitions</li> </ul>
<p><b><i>Relevant personnel, colleagues and specialist resource managers</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• colleagues and specialist resource managers</li> <li>• managers</li> <li>• occupational health and safety committees and other people with specialist responsibilities</li> <li>• other employees</li> <li>• people from a wide range of social, cultural and ethnic backgrounds, and people with a range of physical and mental abilities</li> <li>• supervisors</li> </ul>
<p><b><i>Operational plans</i></b> may refer to:</p>	<ul style="list-style-type: none"> <li>• organisational plans</li> <li>• tactical plans developed by the department or section to detail product and service performance</li> </ul>
<p><b><i>Key performance indicators</i></b> may refer to:</p>	<ul style="list-style-type: none"> <li>• measures for monitoring or evaluating the efficiency or effectiveness of a system, and which may be used to demonstrate accountability and to identify areas for improvements</li> </ul>
<p><b><i>Contingency planning</i></b> may refer to:</p>	<ul style="list-style-type: none"> <li>• contracting out or outsourcing human resources and other functions or tasks</li> <li>• diversification of outcomes</li> <li>• finding cheaper or lower quality raw materials and consumables</li> <li>• increasing sales or production</li> <li>• recycling and re-use</li> <li>• rental, hire purchase or alternative means of procurement of required materials, equipment and stock</li> <li>• restructuring of organisation to reduce labour</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>costs</li> <li>• risk identification, assessment and management processes</li> <li>• seeking further funding</li> <li>• strategies for reducing costs, wastage, stock or consumables</li> <li>• succession planning</li> </ul>
<i>Consultation processes</i> may refer to:	<ul style="list-style-type: none"> <li>• mechanisms used to provide feedback to the work team in relation to outcomes of consultation</li> <li>• meetings, interviews, brainstorming sessions, email/intranet communications, newsletters or other processes and devices which ensure that all employees have the opportunity to contribute to team and individual operational plans</li> </ul>
<i>Organisation's policies, practices and procedures</i> may include:	<ul style="list-style-type: none"> <li>• organisational culture</li> <li>• Standard Operating Procedures</li> <li>• organisational guidelines which govern and prescribe operational functions, such as the acquisition and management of human and physical resources</li> <li>• undocumented practices in line with organisational operations</li> </ul>
<i>Performance systems and processes</i> may refer to:	<ul style="list-style-type: none"> <li>• informal systems used by frontline managers for the work team in the place of existing organisation-wide systems</li> <li>• formal processes within the organisation to measure performance, such as: <ul style="list-style-type: none"> <li>• feedback arrangements</li> <li>• individual and teamwork plans</li> <li>• KPIs</li> <li>• specified work outcomes</li> </ul> </li> </ul>
<i>Designated persons/groups</i> may include:	<ul style="list-style-type: none"> <li>• other affected work groups or teams and groups designated in workplace policies and procedures</li> <li>• those who have the authority to make decisions and/or recommendations about operations such as workplace supervisors, other managers</li> </ul>
<i>Systems, procedures and records</i>	<ul style="list-style-type: none"> <li>• databases and other recording mechanisms for ensuring records are kept in accordance with</li> </ul>

**RANGE STATEMENT**

may include:	organisational requirements <ul style="list-style-type: none"> <li>• individual and team performance plans</li> <li>• organisational policies and procedures relative to performance</li> </ul>
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**Unit Sector(s)**

<b>Unit sector</b>	
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**Competency field**

<b>Competency field</b>	Management and Leadership - Management
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**Co-requisite units**

<b>Co-requisite units</b>		

## **Modification History**

Not Available

## **Unit Descriptor**

Not Available

## **Application of the Unit**

Not Available

## **Licensing/Regulatory Information**

Not Available

## **Pre-Requisites**

Not Available

## **Employability Skills Information**

Not Available

## **Elements and Performance Criteria Pre-Content**

Not Available

## **Elements and Performance Criteria**

Not Available

## **Required Skills and Knowledge**

Not Available

## **Evidence Guide**

Not Available

## **Range Statement**

Not Available

## **Unit Sector(s)**

Not Available



## BSBWOR204A Use business technology

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit describes the performance outcomes, skills and knowledge required to select, use and maintain a range of business technology. This technology includes the effective use of computer software to organise information and data.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to individuals who use business technology to perform a range of routine tasks. They use a limited range of practical skills and fundamental knowledge of equipment use and the organisation of data or files in a defined context, under direct supervision or with limited individual responsibility.</p>
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### Licensing/Regulatory Information

Not applicable.

### 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
1. Select and use technology	1.1. Select appropriate <i>technology</i> and <i>software applications</i> to achieve the requirements of the task 1.2. Adjust workspace, furniture and equipment to suit user ergonomic requirements 1.3. Use technology according to <i>organisational requirements</i> and in a way which promotes a safe work environment
2. Process and organise data	2.1. Identify, open, generate or amend files and records according to task and organisational requirements 2.2. Operate <i>input devices</i> according to organisational requirements 2.3. <i>Store data</i> appropriately and exit applications without damage to or loss of, data 2.4. Use manuals, training booklets and/or online help or help-desks to overcome basic difficulties with applications
3. Maintain technology	3.1. Identify and replace used <i>technology consumables</i> in accordance with manufacturer's instructions and organisational requirements 3.2. Carry out and/or arrange <i>routine maintenance</i> to ensure equipment is maintained in accordance with manufacturer's instructions and organisational requirements 3.3. <i>Identify equipment faults</i> accurately and take action in accordance with manufacturer's instructions or report fault to designated person

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- literacy skills to identify work requirements; to understand and process basic, relevant workplace information; and to follow written instructions
- communication skills to request advice, to receive feedback and to work with a team
- problem-solving skills to solve routine technology problems.

#### Required knowledge

- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
  - anti-discrimination legislation
- ethical principles
  - codes of practice
  - privacy laws
  - occupational health and safety (OHS)
- organisational policies, plans and procedures, especially in regard to file-naming and storage conventions
- organisational IT procedures including back-up and virus protection procedures
- basic technical terminology in relation to reading help-files and manuals.

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> <li>• selection and application of appropriate equipment and software applications in relation to assigned task/s</li> <li>• access, retrieval and storage of required data</li> <li>• performance of basic maintenance on a range of office equipment</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>• access to an actual workplace or simulated environment</li> <li>• access to office equipment and resources</li> <li>• examples of files and data for storage</li> <li>• manuals and training booklets for equipment.</li> </ul>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>• direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate</li> <li>• analysis of responses to case studies and scenarios</li> <li>• demonstration of techniques</li> <li>• oral or written questioning to assess knowledge of office equipment</li> <li>• evaluation of maintaining technology.</li> </ul>
<b>Guidance information for assessment</b>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>• IT use units</li> <li>• other industry capability units.</li> </ul>

## Range Statement

### 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.

<p><b><i>Technology</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• computer technology, such as laptops and personal computers</li> <li>• digital cameras</li> <li>• modems</li> <li>• printers</li> <li>• scanners</li> <li>• zip drives</li> <li>• photocopiers</li> <li>• shredders</li> <li>• binders</li> <li>• laminators</li> <li>• cutters</li> </ul>
<p><b><i>Software applications</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• email, internet</li> <li>• word processing, spreadsheet, database, accounting or presentation packages</li> </ul>
<p><b><i>Organisational requirements</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• correctly identifying and opening files</li> <li>• legal and organisation policies, guidelines and requirements</li> <li>• locating data</li> <li>• log-on procedures</li> <li>• manufacturer's guidelines</li> <li>• OHS policies, procedures and programs</li> <li>• saving and closing files</li> <li>• storing data</li> </ul>
<p><b><i>Input devices</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• keyboard</li> <li>• mouse</li> <li>• numerical key pad</li> <li>• scanner</li> </ul>
<p><b><i>Storage of data</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• appropriate storage/filing of hard copies of computer generated documents</li> <li>• storage in directories and sub-directories</li> <li>• storage on CD-ROMs, hard and floppy disk drives or back-up systems</li> </ul>

<b>RANGE STATEMENT</b>	
<i>Technology consumables</i> may include:	<ul style="list-style-type: none"> <li>• back-up tapes</li> <li>• CD-ROM</li> <li>• floppy disks</li> <li>• print heads</li> <li>• printer ribbons and cartridges</li> <li>• toner cartridges</li> <li>• zip disks</li> </ul>
<i>Routine maintenance</i> may include:	<ul style="list-style-type: none"> <li>• in-house cleaning and servicing of equipment according to manufacturer's guidelines</li> <li>• periodic servicing by qualified or manufacturer approved, technician</li> <li>• regular checking of equipment</li> <li>• replacing consumables</li> </ul>
<i>Identifying equipment faults</i> may include:	<ul style="list-style-type: none"> <li>• checking repairs have been carried out</li> <li>• encouraging feedback from work colleagues</li> <li>• keeping a log book of detected faults</li> <li>• preparing a maintenance program</li> <li>• regular back-ups of data</li> <li>• regular OHS inspections</li> <li>• routine checking of equipment</li> </ul>

### Unit Sector(s)

<b>Unit sector</b>	
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### Competency field

<b>Competency field</b>	Industry Capability - Workplace Effectiveness
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### Co-requisite units

<b>Co-requisite units</b>	

<b>Co-requisite units</b>		



## BSBWOR301A Organise personal work priorities and development

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit descriptor</b>	<p>This unit describes the performance outcomes, skills and knowledge required to organise own work schedules, to monitor and obtain feedback on work performance, and to maintain required levels of competence.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit applies to individuals who are skilled operators and apply a broad range of competencies in various work contexts. They may exercise discretion and judgement using appropriate theoretical knowledge of work scheduling and performance improvement to provide technical advice and support to a team.</p>
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### Licensing/Regulatory Information

Not applicable.

### 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. Organise and complete own work schedule</p>	<p>1.1. Ensure that <i>work goals and objectives</i> are understood, negotiated and agreed in accordance with <i>organisational requirements</i></p> <p>1.2. Assess and prioritise workload to ensure tasks are completed within identified timeframes</p> <p>1.3. Identify <i>factors affecting the achievement of work objectives</i> and incorporate contingencies into work plans</p> <p>1.4. Use <i>business technology</i> efficiently and effectively to manage and monitor scheduling and completion of tasks</p>
<p>2. Monitor own work performance</p>	<p>2.1. Accurately monitor and adjust personal work performance through self-assessment to ensure achievement of tasks</p> <p>2.2. Ensure that <i>feedback on performance</i> is actively sought and evaluated from colleagues and clients in the context of individual and group requirements</p> <p>2.3. Routinely identify and report on variations in the quality of service and products in accordance with organisational requirements</p> <p>2.4. Identify <i>signs of stress</i> and effects on <i>personal wellbeing</i></p> <p>2.5. Identify <i>sources of stress</i> and access appropriate <i>supports and resolution strategies</i></p>
<p>3. Coordinate personal skill development and learning</p>	<p>3.1. Identify personal learning needs and skill gaps using self-assessment and advice from colleagues and clients in relation to role and organisational requirements</p> <p>3.2. Identify, prioritise and plan opportunities for undertaking personal skill development activities in liaison with work groups and relevant personnel</p> <p>3.3. Access, complete and record <i>professional development opportunities</i> to facilitate continuous learning and career development</p> <p>3.4. Incorporate formal and informal feedback into review of further learning needs</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- literacy skills to read and understand the organisation's procedures, own work goals and objectives
- planning skills to organise work priorities and arrangements
- problem-solving skills to solve routine problems
- communication skills to give and receive constructive feedback relating to development needs.

#### Required knowledge

- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
  - anti-discrimination legislation
  - ethical principles
  - codes of practice
  - privacy laws
  - occupational health and safety (OHS)
- organisational policies, plans and procedures
- methods to elicit, analyse and interpret feedback
- principles and techniques of goal setting, measuring performance, time management and personal assessment
- competency standards and how to interpret them in relation to self
- methods to identify and prioritise personal learning needs.

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> <li>• preparing work plans</li> <li>• scheduling and prioritising work objectives and tasks</li> <li>• knowledge of the principles and techniques of goal setting, measuring performance, time management and personal assessment.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>• access to an actual workplace or simulated environment</li> <li>• access to office equipment and resources</li> <li>• examples of work schedules and performance improvement plans.</li> </ul>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>• direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate</li> <li>• review of self-assessment documentation outlining learning and development needs</li> <li>• analysis of responses to case studies and scenarios</li> <li>• demonstration of techniques</li> <li>• oral or written questioning to assess knowledge of methods to identify and prioritise personal learning needs</li> <li>• evaluation of planning for personal skill development activities and professional development opportunities.</li> </ul>
<b>Guidance information for assessment</b>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>• other industry capability units.</li> </ul>



## Range Statement

### 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 goals and objectives*** may include:

- budgetary targets
- production targets
- reporting deadlines
- sales targets
- team and individual learning goals
- team participation

***Organisational requirements*** may include:

- access and equity principles and practice
- business and performance plans
- defined resource parameters
- ethical standards
- goals, objectives, plans, systems and processes
- legal and organisational policies, guidelines and requirements
- OHS policies, procedures and programs
- quality and continuous improvement processes and standards
- quality assurance and/or procedures manuals

***Factors affecting the achievement of work objectives*** may include:

- budget constraints
- competing work demands
- environmental factors such as time, weather
- resource and materials availability
- technology/equipment breakdowns
- unforeseen incidents
- workplace hazards, risks and controls

***Business technology*** may include:

- computer applications
- computers
- email
- facsimile machines
- internet/extranet/intranet
- modems
- personal schedulers
- photocopiers

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• printers</li> <li>• scanners</li> </ul>
<i>Feedback on performance</i> may include:	<ul style="list-style-type: none"> <li>• formal/informal performance appraisals</li> <li>• obtaining feedback from clients</li> <li>• obtaining feedback from supervisors and colleagues</li> <li>• personal, reflective behaviour strategies</li> <li>• routine organisational methods for monitoring service delivery</li> </ul>
<i>Signs of stress</i> may include:	<ul style="list-style-type: none"> <li>• absence from work</li> <li>• alcohol or other substance abuse</li> <li>• conflict</li> <li>• poor work performance</li> </ul>
<i>Personal wellbeing</i> may include:	<ul style="list-style-type: none"> <li>• cultural</li> <li>• emotional</li> <li>• social</li> <li>• spiritual</li> </ul>
<i>Sources of stress</i> may include:	<ul style="list-style-type: none"> <li>• complex tasks</li> <li>• cultural issues</li> <li>• work and family conflict</li> <li>• workloads</li> </ul>
<i>Supports and resolution strategies</i> may include:	<ul style="list-style-type: none"> <li>• awareness raising</li> <li>• counselling</li> <li>• employee assistance programs (EAP)</li> <li>• family support</li> <li>• group activities</li> <li>• job design</li> <li>• mediation</li> <li>• sharing load</li> <li>• time off</li> <li>• training</li> </ul>
<i>Professional development opportunities</i> may include:	<ul style="list-style-type: none"> <li>• career planning/development</li> <li>• coaching, mentoring and/or supervision</li> <li>• formal/informal learning programs</li> <li>• internal/external training provision</li> <li>• performance appraisals</li> <li>• personal study</li> <li>• quality assurance assessments and recommendations</li> <li>• recognition of current competence/skills</li> </ul>



**RANGE STATEMENT**

	recognition <ul style="list-style-type: none"> <li>• work experience/exchange/opportunities</li> <li>• workplace skills assessment</li> </ul>
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**Unit Sector(s)**

<b>Unit sector</b>	
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**Competency field**

<b>Competency field</b>	Industry Capability - Workplace Effectiveness
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**Co-requisite units**

<b>Co-requisite units</b>		

## BSBWOR404A Develop work priorities

### Modification History

Not Applicable

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to plan one's own work schedules, to monitor and to obtain feedback on work performance and development. It also addresses the requirement to take responsibility for one's own career planning and professional development.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

### Application of the Unit

This unit applies to individuals who are required to design their own work schedules and work plans, and to establish priorities for their work. They will typically hold some responsibilities for the work of others and have some autonomy in relation to their own role.

### Licensing/Regulatory Information

Not Applicable

### Pre-Requisites

Not Applicable

### Employability Skills Information

This unit contains employability skills.

### Elements and Performance Criteria Pre-Content

<p>Elements describe the essential outcomes of a unit of competency.</p>	<p>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.</p>
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and complete own work schedule	1.1. <b>Workgroup</b> plans are prepared to reflect consideration of resources, client needs and workgroup targets 1.2. <b>Work objectives</b> and priorities are analysed and incorporated into personal schedules and responsibilities 1.3. <b>Factors affecting the achievement of work objectives</b> are identified and contingencies established and incorporated into work plans 1.4. <b>Business technology</b> is used efficiently and effectively to manage and monitor planning completion and scheduling of tasks
2. Monitor own work performance	2.1. Personal performance standards are identified and analysed through self-assessment and feedback from others on the achievement of work objectives 2.2. <b>Feedback on performance</b> is actively sought from colleagues and clients and evaluated in context of individual and group requirements 2.3. Variations in the quality of service and products are routinely identified and reported in accordance with organisational requirements
3. Coordinate professional development	3.1. Personal knowledge and skills are assessed against organisational benchmarks to determine development needs and priorities 3.2. Opportunities for improvement and sources of learning are researched and planned in liaison with colleagues 3.3. <b>Feedback</b> is used to identify and develop ways to improve competence within available opportunities 3.4. New skills are identified and <b>professional development activities</b> are accessed and completed to facilitate continuous learning and career development 3.5. Records and documents relating to achievements and assessments are stored and maintained in accordance with

	organisational requirements
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## Required Skills and Knowledge

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

### Required skills

- learning skills to recognise and develop new and necessary skills and knowledge
- literacy skills to understand the organisation's policies, procedures and communications, to write personal work plans and professional development plans, and to request and receive feedback about performance
- organising skills to prioritise, manage time and meet deadlines
- problem solving skills to develop contingency plans

### Required knowledge

- knowledge of relevant business technology applications to schedule tasks and plan work
- knowledge of techniques to prepare personal plans and establish priorities
- methods to identify and prioritise personal learning needs
- understanding of a range of professional development options
- understanding of methods to elicit, analyse and interpret feedback
- understanding of methods to evaluate own performance

## Evidence Guide

<p>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.</p>	
<p><b>Overview of assessment</b></p>	
<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>Evidence of the following is essential:</p> <ul style="list-style-type: none"> <li>• preparing and communicating own work plan</li> <li>• scheduling work objectives and tasks to support the achievement of goals</li> <li>• seeking and acting on feedback from clients and colleagues</li> <li>• reviewing own work performance against achievements through self-assessment</li> <li>• accessing learning opportunities to extend own personal work competencies</li> <li>• using business technology to monitor self development.</li> </ul>
<p><b>Context of and specific resources for assessment</b></p>	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>• the learner and trainer should have access to appropriate documentation and resources normally used in the workplace</li> </ul>
<p><b>Method of assessment</b></p>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>• direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate</li> <li>• observation of performance in role plays</li> <li>• observation of presentations</li> <li>• review of work and professional development plans.</li> </ul>
<p><b>Guidance information for assessment</b></p>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>• Other units from the Certificate IV in Frontline Management.</li> </ul>

## Range Statement

<p>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.</p>	
<p><b><i>Workgroup plans</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• budgetary plans</li> <li>• production plans</li> <li>• reporting plans</li> <li>• sales plans</li> <li>• team and individual learning goals</li> <li>• team participation</li> <li>• work schedules</li> </ul>
<p><b><i>Work objectives</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• budgetary targets</li> <li>• production targets</li> <li>• reporting deadlines</li> <li>• sales targets</li> <li>• team and individual learning goals</li> <li>• team participation</li> </ul>
<p><b><i>Factors affecting the achievement of work objectives</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• budget constraints</li> <li>• competing work demands</li> <li>• environmental factors such as time, weather, etc</li> <li>• personnel</li> <li>• resource and materials availability</li> <li>• technology/equipment breakdowns</li> <li>• unforeseen incidents</li> </ul>
<p><b><i>Business technology</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• computer applications</li> <li>• computers</li> <li>• email and internet/intranet/extranet</li> <li>• facsimile machines</li> <li>• modems</li> <li>• personal schedules</li> <li>• photocopiers</li> <li>• printers</li> <li>• scanners</li> </ul>
<p><b><i>Feedback on performance</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• formal/informal performance appraisals</li> <li>• obtaining comments from clients</li> <li>• obtaining comments from supervisors and colleagues</li> <li>• personal, reflective behaviour strategies</li> </ul>

	<ul style="list-style-type: none"><li>• routine organisational methods for monitoring service delivery</li></ul>
<i>Professional development activities</i> may include:	<ul style="list-style-type: none"><li>• career planning/development</li><li>• coaching, mentoring and/or supervision</li><li>• formal/informal learning programs</li><li>• internal/external training provision</li><li>• performance appraisals</li><li>• personal study</li><li>• Recognition of Prior Learning</li><li>• work experience/exchange/opportunities</li><li>• workplace skills assessment</li></ul>

## Unit Sector(s)

Management and Leadership - Management

## CPPSIS4002A Store and retrieve spatial data

### Modification History

Not Applicable

### Unit Descriptor

#### Unit descriptor

This unit of competency specifies the outcomes required to store and retrieve spatial data from a range of storage media, including digital or hard copy storage. It requires the ability to analyse and evaluate spatial information from a variety of sources and to identify and access spatial information for set task requirements. Functions would be carried out under limited supervision and within organisational guidelines.

### Application of the Unit

#### Application of the unit

This unit of competency supports the application of organisational, sound communication and basic problem-solving skills, the ability to demonstrate initiative and enterprise, and the use of technology. The skills and knowledge acquired upon completion of this unit would apply to the needs of employees in supporting positions for surveying, town planning, cartography, mapping and geographic information systems (GIS).

While no licensing, legislative, regulatory or certification requirements apply holistically to this unit at the time of publication, relevant federal, and state or territory legislation, regulations and codes of practice impact upon this unit (see unit performance criteria and range statement).

### Licensing/Regulatory Information

Refer to Application of the Unit



## Pre-Requisites

Prerequisite units Nil

## Employability Skills Information

**Employability skills** The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged, will assist in identifying employability skills requirements.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

### ELEMENT

### PERFORMANCE CRITERIA

#### 1 Store spatial data.

- 1.1 Data index is created to assist in retrieval and storage according to organisational spatial data and legal requirements.
- 1.2 *Administrative and legal requirements* for data storage are complied with and recorded.
- 1.3 Data is recorded in index according to *organisational guidelines*.
- 1.4 Spatial data is backed up according to organisational guidelines.
- 1.5 *Method of spatial data storage* is selected according to organisational guidelines.
- 1.6 *Distribution method* is determined to ensure that the most current data is available.
- 1.7 Skills and knowledge are updated to accommodate changes in data storage and retrieval processes.

#### 2 Access and retrieve spatial data.

- 2.1 Indexing system is used to locate spatial data source.
- 2.2 Spatial data is translated into required format where necessary.

#### 3 Manage contingencies.

- 3.1 All reasonable *contingencies* and possible solutions to anticipated problems are considered in the development of a *risk management plan*.
- 3.2 Contingency plans are implemented where necessary.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- ability to relate to people from a range of social, cultural and ethnic backgrounds and with a range of physical and mental abilities
- analysis
- communication skills to:
  - discuss vocational issues effectively with colleagues
  - impart knowledge and ideas through oral, written and visual means
- computer skills to network

## REQUIRED SKILLS AND KNOWLEDGE

- literacy skills to:
  - assess and use workplace information
  - interpret and understand legal, financial and procedural requirements
  - process workplace documentation
  - read and record data and write routine reports
  - research and access routine sources of spatial data
- numeracy skills to:
  - record and interpret statistics
  - record with accuracy and precision
  - undertake computations
- organisational skills to:
  - maintain information systems
  - prioritise activities to meet contractual requirements
- spatial skills to:
  - perform spatial data archival and retrieval
  - perform spatial data management and manipulation
  - perform file management
  - solve basic problems relating to height, depth, breadth, dimension, direction and position in actual operational activity and virtual representation
  - understand implications of height, depth, breadth, dimension and position to actual operational activity and virtual representation.

### Required knowledge and understanding:

- classification systems, processes and products linked to specification
- corporate information database environment
- current indexing systems
- data retrieval methods, querying and browsing
- downloading global positioning system (GPS) and GIS
- network and security guidelines
- OHS requirements
- organisational policies and guidelines
- reference systems and their relationship to each other
- risk management principles as applied to spatial data storage
- spatial data formats
- spatial data management practices
- spatial data structure requirements
- storage media
- spatial reference systems.

## 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, the range statement and the Assessment Guidelines for this Training Package.

#### Overview of assessment

This unit of competency could be assessed on its own or in combination with other units relevant to the job function, for example units CPPSIS4001A Maintain spatial systems, CPPSIS4004A Collect and set out basic spatial data, CPPSIS4005A Collect basic GPS data, and CPPSIS4014A Maintain spatial data.

#### 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:

- applying data security and backup measures
- creating a workable index system
- managing contingencies
- retrieving spatial data.

#### Specific resources for assessment

Resource implications for assessment include access to:

- assignment instructions, work plans and schedules, policy documents and duty statements
- assessment instruments, including personal planner and assessment record book
- registered training provider of assessment services
- relevant guidelines, regulations and codes of practice
- suitable venue and equipment.

Access must be provided to appropriate learning and assessment support when required.

Where applicable, physical resources should include equipment modified for people with disabilities.

#### Context of assessment

Holistic: based on the performance criteria, evidence guide, range statement, and required skills and knowledge.

#### Method of assessment

Demonstrated over a period of time and observed by the assessor (or assessment team working together to conduct the assessment).

Demonstrated competency in a range of situations, which may include customer/workplace interruptions and involvement in related activities normally experienced in the workplace.

Obtained by observing activities in this field and reviewing induction information. If this is not practicable,

observation in realistic simulated environments may be substituted.

### **Guidance information for assessment**

Assessment requires that the clients' objectives and industry expectations are met. If the clients' objectives are narrowly defined or not representative of industry needs, it may be necessary to refer to portfolio case studies of a variety of spatial information services requirements to assess competency.

Oral questioning or written assessment and hypothetical situations (scenarios) may be used to assess underpinning knowledge (in assessment situations where the candidate is offered a preference between oral questioning or written assessment, questions are to be identical).

Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff.

All practical demonstration must adhere to the safety and environmental regulations relevant to each State or Territory.

Where assessment is for the purpose of recognition (recognition of current competencies [RCC] or recognition of prior learning [RPL]), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge.

Assessment processes will be appropriate to the language and literacy levels of the candidate and any cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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 in the performance criteria is detailed below. Add any 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.

- Administrative and legal requirements*** may include:
- access protocols and obligations
  - Australian standards, quality assurance and certification requirements
  - award and enterprise agreements
  - licensing arrangements
  - organisational protocols for accessing physical, financial and human resources
  - reimbursements
  - Indigenous considerations
  - relevant codes of practice
  - relevant state, territory and federal legislation affecting organisational operations, including:
    - anti-discrimination and diversity
    - copyright and digital copyright
    - equal employment opportunity (EEO)
    - industrial relations
  - royalty obligations
  - title search processes
  - understanding of company OHS guidelines.
- Organisational guidelines*** may be included in:
- electronic format
  - equipment specifications
  - operator manuals
  - printed product instructions and information
  - spatial database
  - spatial reference systems
  - warranty documents.
- Method of spatial data storage*** may include:
- digital
  - hard copy.
- Distribution method*** may include:
- network access to an authoritative data source that can accommodate storage in digital or hard copy format.
- Contingencies*** may include:
- duplicates

- fireproof storage
  - insurance
  - media malfunction
  - media and formats becoming outdated
  - offsite storage
  - storage in different media.
- Risk management plan* may include:
- effective management
  - budgetary constraints
  - timelines
  - clearly identified project stages
  - sound internal audit processes.

## Unit Sector(s)

Unit sector                      Spatial information services

## CPPSIS5002A Capture new spatial data

### Modification History

Not Applicable

### Unit Descriptor

#### Unit descriptor

This unit of competency specifies the outcomes required to capture new data using a variety of methods. It requires the ability to plan and execute the data capture process in a supervisory capacity, incorporating technical problems and management requirements and applying appropriate solutions to a range of data collection situations. Functions would be carried out within organisational guidelines.

### Application of the Unit

#### Application of the unit

This unit of competency supports the application of theoretical and practical analysis; organisational, team leadership and sound problem-solving skills; the ability to demonstrate initiative and enterprise; and a sound understanding of technology. The skills and knowledge acquired upon completion of this unit would support the needs of employees in surveying, cartography, town planning, mapping or geographic information systems.

Licensing, legislative, regulatory and certification requirements may impact on this unit. Incorporate these requirements according to state, territory and federal legislation.

### Licensing/Regulatory Information

Refer to Application of the Unit



## Pre-Requisites

Prerequisite units Nil

## Employability Skills Information

**Employability skills** The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged, will assist in identifying employability skills requirements.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

### ELEMENT

### PERFORMANCE CRITERIA

#### 1 Prepare for data collection.

- 1.1 Key activities and timelines are scheduled with full consideration given to specification, available resources and organisational requirements.
- 1.2 *Administrative and legal requirements* for data collection are complied with and recorded.
- 1.3 *Appropriate persons or relevant personnel* are informed about the project.
- 1.4 *Equipment, supplies and spatial information services (SIS) technologies* are selected according to the task requirements.
- 1.5 Designated responsibilities are communicated to staff to ensure clarity of understanding of the work and provide a basis for ongoing assessment.
- 1.6 Skills and knowledge are updated to accommodate changes in data capture techniques.

#### 2 Gather data.

- 2.1 Equipment is operated according to *manufacturer specifications*, and statutory and organisational guidelines.
- 2.2 *Entities* are related to a *reference system* based on the specifications.
- 2.3 Data and *attributes* are collected using methodologies detailed in the *data capture methodology*.
- 2.4 *Metadata* is documented according to accepted industry standards.
- 2.5 Any discrepancies between specifications and actual activities are identified, recorded and reported.
- 2.6 Administrative and legal requirements for data collection are complied with and recorded.
- 2.7 Guidance is given to staff assisting in the data collection process.
- 2.8 *OHS requirements* are planned for and adhered to.

#### 3 Use equipment.

- 3.1 Appropriate equipment is selected.
- 3.2 Equipment is operated according to the task requirements and manufacturer specifications.
- 3.3 All safety requirements are adhered to.

#### 4 Maintain equipment.

- 4.1 *Operational maintenance* of equipment is undertaken according to organisational guidelines.
- 4.2 *Contingencies* that may affect equipment usage are reported.
- 4.3 Unsafe or faulty equipment is reported and referred for

ELEMENT	PERFORMANCE CRITERIA
<b>5 Finalise the collection process.</b>	<p>repair.</p> <p>4.4 Tools and equipment are stored safely in appropriate locations and according to manufacturer specifications.</p> <p>5.1 Attributes and <i>topological structures</i> are added to spatial data according to specifications.</p> <p>5.2 All data is recorded correctly and <i>required documentation</i> is completed according to specifications and organisational requirements.</p> <p>5.3 All data and documentation are stored according to organisational requirements.</p> <p>5.4 Data integrity is checked according to the validation plan.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

- ability to analyse theory, concepts and statistics (high level)
- ability to relate to people from a range of social, cultural and ethnic backgrounds and with a range of physical and mental abilities
- change management
- communication skills to:
  - consult effectively with clients and colleagues
  - impart knowledge and ideas through oral, written and visual means
  - provide customer service
- computer skills (high technical user level) to complete business documentation
- functional application of data capture techniques
- literacy skills to:
  - assess and use workplace information
  - locate and interpret legislation and other written documentation
  - prepare and manage documentation
  - read and write technical reports
  - research and evaluate
- negotiation skills
- numeracy skills to:

## REQUIRED SKILLS AND KNOWLEDGE

- analyse errors
- conduct image analysis
- perform mental calculations
- interpret and analyse statistics
- record with accuracy and precision
- undertake computations
- organisational skills to:
  - coordinate technical and human resource inputs to research activities
  - prioritise activities to meet contractual requirements
- planning
- project management skills
- spatial skills to:
  - display proficiency in the operation of spatial data capture equipment
  - exercise precision and accuracy in relation to spatial and aspatial data acquisition and the use of electronic equipment
  - perform spatial data archival and retrieval and train others in this task
  - perform spatial data management and manipulation and train others in this task
  - perform file management and train others in this task
  - solve problems relating to height, depth, breadth, dimension, direction and position in actual operational activity and virtual representation
  - understand implications of height, depth, breadth, dimension and position to actual operational activity and virtual representation
- team leadership
- work effectively as part of a team.

### Required knowledge and understanding:

- characteristics, capabilities and limitations of tools, technology and equipment used
- customer relations guidelines
- data collection methods using electronic equipment
- information management
- legislation as it applies to the spatial industry sector
- OHS requirements
- organisational policies and guidelines
- performance evaluation
- process improvement methods
- quality assurance principles
- quality improvement tools
- reference systems and their relationship to each other
- relevant federal, state and local government laws which are applicable to the

## REQUIRED SKILLS AND KNOWLEDGE

- spatial data capture methodology used
- risk assessment principles
- safe work practices
- spatial data formats, handling and structure
- spatial information principles and their application
- SIS project contingencies
- spatial technologies.

## 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, the range statement and the Assessment Guidelines for this Training Package.

#### Overview of assessment

This unit of competency could be assessed on its own or in combination with other units relevant to the job function, for example units CPPSIS5001A Plan spatial data collection and validation, CPPSIS5005A Obtain and validate existing spatial data, CPPSIS5006A Integrate spatial datasets, CPPSIS5007A Maintain complex spatial data systems, and CPPSIS5008A Develop a complex spatial and aspatial database.

#### 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:

- applying a defined range of skills
- applying known solutions to a range of problems
- assessing and recording information from varied sources
- demonstrating operational knowledge in relevant data capture and validation methodologies
- performing a range of tasks where choice between a range of options is required
- taking responsibility for own and team outputs in work and learning.

#### Specific resources for assessment

Resource implications for assessment include access to:

- assessment instruments, including personal planner and assessment record book
- assignment instructions, work plans and schedules, policy documents and duty statements

- registered training provider of assessment services
- relevant guidelines, regulations and codes of practice
- suitable venue and equipment.

Access must be provided to appropriate learning and assessment support when required.

Where applicable, physical resources should include equipment modified for people with disabilities.

**Context of assessment**

Holistic: based on the performance criteria, evidence guide, range statement, and required skills and knowledge.

**Method of assessment**

Demonstrated over a period of time and observed by the assessor (or assessment team working together to conduct the assessment).

Demonstrated competency in a range of situations, which may include customer/workplace interruptions and involvement in related activities normally experienced in the workplace.

Obtained by observing activities in the field and reviewing induction information. If this is not practicable, observation in realistic simulated environments may be substituted.

**Guidance information for assessment**

Assessment requires that the clients' objectives and industry expectations are met. If the clients' objectives are narrowly defined or not representative of industry needs, it may be necessary to refer to portfolio case studies of a variety of SIS requirements to assess competency.

Oral questioning or written assessment and hypothetical situations (scenarios) may be used to assess underpinning knowledge (in assessment situations where the candidate is offered a preference between oral questioning or written assessment, questions are to be identical).

Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff.

All practical demonstration must adhere to the safety and environmental regulations relevant to each State or Territory.

Where assessment is for the purpose of recognition

(recognition of current competencies [RCC] or recognition of prior learning [RPL]), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge.

Assessment processes will be appropriate to the language and literacy levels of the candidate and any cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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 in the performance criteria is detailed below. Add any 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.

***Administrative and legal requirements*** may include:

- access protocols and obligations
- Australian standards, quality assurance and certification requirements
- award and enterprise agreements
- company OHS guidelines
- licensing arrangements
- organisational protocols for accessing physical, financial and human resources
- reimbursements
- Indigenous considerations
- relevant codes of practice
- relevant state, territory or federal legislation that affects organisational operations, including:
  - anti-discrimination and diversity
  - copyright and digital copyright
  - equal employment opportunity (EEO)
  - industrial relations
- royalty obligations
- title search processes.
- administrative staff
- assessors
- colleagues
- contractors
- field survey staff
- land occupiers
- land owners
- managers
- supervisors
- technicians
- trainers.
- data logger or other mobile computing device
- data recording equipment

***Appropriate persons or relevant personnel*** may include:

***Equipment, supplies and SIS technologies*** may



include:

- digital imagery
- electronic theodolites
- handheld global positioning system (GPS)
- levels
- maps (digital or hard copy)
- measuring instruments
- non-navigational aids relevant to duties, including:
  - compass
  - clinometer
  - distance measuring wheel
- personal digital assistant
- personal computer-based digitising boards
- sonar
- tide gauge
- tools
- total station
- ultra high frequency (UHF) radio
- vehicles.

**Manufacturer specifications** may be found in:

- electronic format
- equipment specifications
- operator manuals
- printed product instructions and information
- spatial database
- warranty documents.

**Entities** may include:

- event
- object.

**Reference system** may include coordinate systems that are:

- global
- local
- regional.

**Attributes** are properties associated with a dataset and may include:

- condition
- date
- size
- type.

**Data capture methodology** may include:

- aerial
- conversion or translation from existing information (hard copy or digital)
- data dogging
- digitising theodolite
- direct or indirect
- field
- GPS scanning

- manual entry
  - photogrammetry
  - remote sensing
  - sonar
  - survey
  - total station.
- Metadata** may include:
- summarised information about a spatial dataset that describes the characteristics of the dataset, including:
    - availability
    - conditions of use
    - coordinate system
    - currency
    - date of acquisition
    - quality
    - source
    - spatial data acquisition methodologies
    - version control.
- OHS requirements** may include:
- Australian standards
  - development of site safety plan
  - identification of potential hazards
  - inspection of work sites
  - training staff in OHS requirements
  - use of personal protective clothing
  - use of safety equipment and signage.
- Operational maintenance** tasks may include:
- adjusting
  - cleaning
  - lubricating
  - maintaining battery
  - simple repairs
  - tightening.
- Contingencies** may include:
- adverse weather
  - equipment failure.
  - relationship between entities.
- Topological structures** may include:
- accident and injury reports
  - authority/approval documentation
  - meeting reports
  - records and reports of communication
  - reimbursement documentation.

## Unit Sector(s)

Unit sector                      Spatial information services

## CPPSIS5010A Collate and interpret spatial data

### Modification History

Not Applicable

### Unit Descriptor

#### Unit descriptor

This unit of competency specifies the outcomes required to collate and interpret spatial data to provide the dataset required for project deliverables, often in a supervisory capacity. It requires the ability to apply theoretical spatial concepts to a range of situations in order to identify and interpret the appropriate information, according to client requirements. Functions would be carried out within organisational guidelines.

### Application of the Unit

#### Application of the unit

This unit of competency supports the application of self-management and problem-solving skills; the use of technology; and planning and organising within data management and data manipulation. The skills and knowledge acquired upon completion of this unit would support the needs of employees in surveying, cartography, town planning, mapping or geographic information systems.

While no licensing, legislative, regulatory or certification requirements apply holistically to this unit at the time of publication, relevant federal, and state or territory legislation, regulations and codes of practice impact upon this unit (see unit performance criteria and range statement).

### Licensing/Regulatory Information

Refer to Application of the Unit

## Pre-Requisites

Prerequisite units Nil

## Employability Skills Information

**Employability skills** The required outcomes described in this unit of competency contain applicable facets of employability skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged, will assist in identifying employability skills requirements.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1 Access data.</b>	<p>1.1 <i>Spatial datasets</i> are retrieved from relevant data storage.</p> <p>1.2 Data is manipulated into an appropriate <i>format</i> to meet <i>client specifications</i>.</p> <p>1.3 Requirements for spatial data and <i>constraints</i> are identified through consultation with <i>client</i> or <i>relevant personnel</i> and outcomes are recorded according to <i>organisational guidelines</i>.</p>
<b>2 Query and interpret data.</b>	<p>2.1 Relevant sources and data are identified and accessed.</p> <p>2.2 Data is queried and <i>interpreted</i> using appropriate equipment or software package according to client requirements.</p> <p>2.3 Data is verified for relevance using <i>descriptive and analytical techniques</i>.</p> <p>2.4 Irregularities are resolved using initiative.</p> <p>2.5 Skills and knowledge are updated to accommodate changes in data.</p> <p>2.6 Results are recorded and documented according to organisational and client requirements.</p> <p>2.7 <i>OHS</i> requirements are planned for and adhered to.</p>
<b>3 Collate data.</b>	<p>3.1 Spatial and <i>aspatial</i> requirements are collated to meet <i>organisational needs</i>.</p> <p>3.2 Most appropriate format and database are selected according to organisational requirements.</p> <p>3.3 Legal and <i>ethical requirements</i> are addressed.</p>
<b>4 Test and validate collated spatial data.</b>	<p>4.1 <i>Tools</i> for testing the <i>validity</i> of the information and data are identified and accessed or developed.</p> <p>4.2 Links with <i>other functional areas and management systems</i> are identified and facilitated to ensure comprehensive information and data collection.</p> <p>4.3 Quality and useability of data are ensured according to organisational guidelines.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for

## REQUIRED SKILLS AND KNOWLEDGE

this unit.

### Required skills:

- ability to relate to people from a range of social, cultural and ethnic backgrounds and with a range of physical and mental abilities
- ability to translate requirements into design
- analytical skills, including systems analysis
- business presentations
- communication skills to:
  - consult effectively with clients and colleagues
  - impart knowledge and ideas through oral, written and visual means
- computer skills (high technical user level) to complete business documentation
- information management
- literacy skills to:
  - assess and use workplace information
  - locate and interpret legislation and other written documentation
  - prepare and manage documentation
  - read and write technical reports
  - research and evaluate in order to assess sources of spatial data
- negotiation skills
- numeracy skills to:
  - analyse errors
  - conduct image analysis
  - interpret and analyse statistics
  - perform mental calculations
  - record with accuracy and precision
  - undertake computations
- organisational skills to:
  - coordinate technical and human resource inputs to research activities
  - prioritise activities to meet contractual requirements
- spatial skills to:
  - display proficiency in the operation of spatial data capture equipment
  - exercise precision and accuracy in relation to spatial and aspatial design
  - perform spatial data archival and retrieval and train others in this task
  - perform spatial data management and manipulation and train others in this task
  - perform file management and train others in this task
  - solve problems relating to height, depth, breadth, dimension, direction and position in actual operational activity and virtual representation
  - understand implications of height, depth, breadth, dimension and position to

## REQUIRED SKILLS AND KNOWLEDGE

actual operational activity and virtual representation.

### Required knowledge and understanding:

- classification systems, processes and products
- computation methods
- coordinating reference systems
- design methods
- industry standards
- OHS guidelines
- operation of relevant software packages
- organisational policies and guidelines
- precision and accuracy in relation to spatial information
- principles of data acquisition (e.g. photogrammetry, remote sensing, terrestrial survey and hydrography)
- business presentation methods
- quality guidelines
- reference systems and their relationship to each other
- risk management
- security management guidelines
- spatial and attribute dataset structure and requirements
- spatial database operation
- spatial database structure requirements
- spatial data handling
- spatial data management practices
- spatial data storage technology.

## 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, the range statement and the Assessment Guidelines for this Training Package.

#### Overview of assessment

This unit of competency could be assessed on its own or in combination with other units relevant to the job function, for example units CPPSIS5007A Maintain complex spatial data systems, and CPPSIS5008A Develop a complex spatial and aspatial database.

#### Critical aspects for assessment and evidence

A person who demonstrates competency in this unit must be able to provide evidence of:



**required to demonstrate competency in this unit**

- taking responsibility for own outputs in work and learning
- using relevant data by manipulating and analysing it to meet the client's requirements, including:
  - applying operational knowledge in a broad range of areas relating to linking datasets and knowledge management
  - applying organisational skills and prioritising activity
  - applying solutions to a range of problems
  - devising and implementing a cost-effective functional solution
  - examining suitability of existing arrangements
  - keeping records accurately
  - measuring outcomes against specifications
  - performing a range of tasks where choice between a substantial range of options is required.

**Specific resources for assessment**

Resource implications for assessment include access to:

- assessment instruments, including personal planner and assessment record book
- assignment instructions, work plans and schedules, policy documents and duty statements
- registered training provider of assessment services
- relevant guidelines, regulations and codes of practice
- suitable venue and equipment.

Access must be provided to appropriate learning and assessment support when required.

Where applicable, physical resources should include equipment modified for people with disabilities.

**Context of assessment**

Holistic: based on the performance criteria, evidence guide, range statement, and required skills and knowledge.

**Method of assessment**

Demonstrated over a period of time and observed by the assessor (or assessment team working together to conduct the assessment).

Demonstrated competency in a range of situations, that may include customer/workplace interruptions and involvement in related activities normally experienced in the workplace.

Obtained by observing activities in the field and reviewing induction information. If this is not practicable, observation in realistic simulated environments may be

substituted.

### **Guidance information for assessment**

Assessment requires that the clients' objectives and industry expectations are met. If the clients' objectives are narrowly defined or not representative of industry needs, it may be necessary to refer to portfolio case studies of a variety of spatial information services requirements to assess competency.

Oral questioning or written assessment and hypothetical situations (scenarios) may be used to assess underpinning knowledge (in assessment situations where the candidate is offered a preference between oral questioning or written assessment, questions are to be identical).

Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff.

All practical demonstration must adhere to the safety and environmental regulations relevant to each State or Territory.

Where assessment is for the purpose of recognition (recognition of current competencies [RCC] or recognition of prior learning [RPL]), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge.

Assessment processes will be appropriate to the language and literacy levels of the candidate and any cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

## Range Statement

### 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 in the performance criteria is detailed below. Add any 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.

- Spatial dataset*** may include:
- digital
  - hard copy
  - image
  - text
  - raster
  - vector.
- Format*** may include:
- electronic information and data management systems (where system refers to computer software).
- Client specifications*** refer to description of outputs and may be contained in:
- contracts
  - memos
  - tender briefs
  - verbal instructions
  - written instructions.
- Constraints*** may include:
- coverage
  - datum
  - environmental factors
  - industry requirements
  - legal and statutory
  - financial
  - resource availability
  - time.
- Client*** may include:
- customers with routine or special requests
  - external to organisation
  - internal to organisation
  - regular and new customers, including:
    - business enterprises
    - government agencies
    - members of the public
    - suppliers.
- Relevant personnel*** may include:
- colleagues
  - staff or employee representatives

- supervisors or line managers
  - suppliers
  - users.
- Organisational guidelines** may include:
- code of ethics
  - company policy
  - legislation relevant to the work or service function, including equal employment opportunity (EEO)
  - manuals
  - OHS policies and procedures
  - personnel practices and guidelines outlining work roles and responsibilities.
- Interpreted** according to:
- equipment available
  - software packages
  - task required.
- Descriptive and analytical techniques** may include:
- statistical tests and methods such as:
    - broad analytical studies to determine estimates of risk
    - making comparisons using basic tests of significance
    - mean, standard deviation, regression analysis and percentage change.
- OHS** may include:
- Australian standards
  - development of site safety plan
  - identification of potential hazards
  - inspection of work sites
  - training staff in OHS requirements
  - use of personal protective clothing
  - use of safety equipment and signage.
- Aspatial** refers to:
- data without a spatial component.
- Organisational needs** may include:
- administration (e.g. postcodes, suburbs, and federal and state electoral counties)
  - analysis of environmental, land and geographic information
  - asset management
  - cartographic services
  - civil engineering
  - digital imagery
  - electricity
  - emergency services management
  - environmental datasets
  - geographic information systems

- hydrography
- integrated services - environmental, land and geographic related datasets
- land ownership tenure system
- local government
- location-based services
- global positioning
- mapping facilities
- photogrammetry
- remote sensing
- site analysis
- survey marks
- sewerage
- telecommunications
- terrestrial survey
- town planning
- utility services such as water
- water catchment.
- confidentiality
- privacy.

***Ethical requirements*** may include:

***Tools*** may include:

- model of questions with known answers
- pilot program
- prototype dataset
- survey (staff in client organisation).

***Validity*** means reflecting the true state of a test result, including tests for systematic distortions such as:

- confounding bias
- information/data bias
- observational bias
- recall bias
- selection bias.

***Other functional areas and management systems*** may include:

- engineering and maintenance
- environmental management
- finance and auditing
- information, data and records management
- human resource, industrial relations and personnel management, including payroll
- logistics
- purchasing, procuring and contracting
- quality management
- strategic planning.

## Unit Sector(s)

Unit sector

Spatial information services

## **LGACOM405B Implement and monitor the organisation's OHS policies, procedures and programs within the work group or section**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

This unit covers implementing and monitoring general occupational health and safety (OHS) policies, procedures and programs in all functional areas of local government. It is appropriate for staff members at the supervisory or team leader level for whom implementation of OHS is a large requirement of their role.

### **Application of the Unit**

#### **Application of the Unit**

This unit supports the attainment of skills and knowledge required for competent workplace performance in councils of all sizes. Knowledge of the legislation and regulations within which councils must operate is essential. The unique nature of councils, as a tier of government directed by elected members and reflecting the needs of local communities, must be appropriately reflected.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

#### **Prerequisite Unit/s**

## Employability Skills Information

**Employability Skills** 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 required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<b>1. Provide information to the work group about OHS and the organisation's OHS policies, procedures and programs</b>	<p>1.1. Relevant provisions of OHS legislation and codes of practice are accurately and clearly explained to the work group.</p> <p>1.2. Information on council's OHS policies, procedures and programs is provided in a readily accessible manner and is accurately and clearly explained to the work group.</p> <p>1.3. Information about identified hazards and the outcomes of risk assessment and control procedures is regularly provided and is accurately and clearly explained to the work group.</p>
<b>2. Implement and monitor participative arrangements for the management of OHS</b>	<p>2.1. Council's procedures for consultation over OHS issues are implemented and monitored to ensure that all members of the work group have the opportunity to contribute.</p> <p>2.2. Issues raised through consultation are dealt with and resolved promptly or referred to the appropriate personnel for resolution in accordance with workplace procedures for issue resolution.</p> <p>2.3. The outcomes of consultation over OHS issues are promptly communicated to the work group.</p>
<b>3. Implement and monitor the organisation's procedures for identifying hazards and assessing risks</b>	<p>3.1. Existing and potential hazards in the work area are identified and reported so that risk assessment and control procedures can be applied.</p>
<b>4. Implement and monitor the organisation's procedures for controlling risks</b>	<p>4.1. Work procedures to control risks are implemented and adherence to them by the work group is monitored in accordance with workplace procedures.</p> <p>4.2. Existing risk control measures are monitored and results are reported regularly in accordance with workplace procedures.</p> <p>4.3. Inadequacies in existing risk control measures are identified in accordance with the hierarchy of control and are reported to designated personnel.</p> <p>4.4. Inadequacies in resource allocation for implementation of risk control measures are identified and reported to designated personnel.</p>
<b>5. Implement the organisation's procedures for</b>	<p>5.1. Workplace procedures for dealing with hazardous events are implemented whenever necessary to ensure that prompt control action is taken.</p>

## **ELEMENT**

**dealing with hazardous events**

**6. Implement and monitor the organisation's procedures for providing OHS training**

**7. Implement and monitor the organisation's procedures for maintaining OHS records**

Hidden text

## **PERFORMANCE CRITERIA**

- 5.2. Hazardous events are investigated to identify their cause in accordance with investigation procedures.
- 5.3. Control measures to prevent recurrence and minimise risks of hazardous events are implemented based on the hierarchy of control, or alternatively, are referred to designated personnel for implementation.
- 6.1. OHS training needs are identified accurately, specifying the gaps between OHS competencies required and those held by work group members.
- 6.2. Arrangements are made for meeting identified OHS training needs in both on and off-the-job training programs in consultation with relevant parties.
- 7.1. OHS records for work area are accurately and legibly completed in accordance with workplace requirements for OHS records and legal requirements for the maintenance of records of occupational injury and disease.
- 7.2. Aggregate information from the area's OHS records is used to identify hazards and monitor risk control procedures within work area according to organisational procedures and within scope of responsibilities.

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit

#### **Required Skills**

- communication strategies for a diverse workforce
- organisational
- contingency management
- hazard and risk identification and control processes and techniques.

#### **Required Knowledge**

- relevant OHS legislation and codes of practice
- risk control measures
- hierarchy of control
- equal employment opportunity principles and practices
- relevant council management systems and procedures, including sustainability practices
- communication techniques.

Hidden text

## Evidence Guide

### EVIDENCE GUIDE

<b>Overview of assessment requirements</b>	A person who demonstrates competency in this unit will be able to perform the outcomes described in the Elements to the required performance level detailed in the Performance Criteria. The knowledge and skill requirements described in the Range Statement must also be demonstrated. For example, knowledge of the legislative framework and safe work practices that underpin the performance of the unit are also required to be demonstrated.
<b>Critical aspects of evidence to be considered</b>	The demonstrated ability to: <ul style="list-style-type: none"><li>• implement and monitor the organisation's OHS policies and procedures</li><li>• implement relevant provisions of OHS legislation and codes of practice</li><li>• identify and control hazards and risks.</li></ul>
<b>Context of assessment</b>	Assessment of performance requirements in this unit should be undertaken within the context of the local government framework. Competency is demonstrated by performance of all stated criteria, including the Range of Variables applicable to the workplace environment.
<b>Relationship to other units (prerequisite or co-requisite units)</b>	Prerequisite units: nil. Co-requisite units: nil.
<b>Method of assessment</b>	The following assessment methods are suggested: <ul style="list-style-type: none"><li>• observation of the learner performing a range of workplace tasks over sufficient time to demonstrate handling of a range of contingencies</li><li>• written and/or oral questioning to assess knowledge and understanding</li><li>• completion of workplace documentation</li><li>• third-party reports from experienced practitioners</li><li>• completion of self-paced learning materials including personal reflection and feedback from trainer, coach or supervisor.</li></ul>
<b>Evidence required for demonstration of consistent performance</b>	Evidence should be gathered over a period of time in a range of actual or simulated management environments.
<b>Resource implications</b>	Access to council workplace or simulated case study that incorporates the following resources:

## EVIDENCE GUIDE

- OHS legislation and council policies, procedures and codes of practice
- staff or simulation for consultation process
- computer system and software.

## Range Statement

### 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 in the Performance Criteria is detailed below.

**Relevant provisions of OHS legislation may include:**

- general duty of care, including public safety requirements for maintenance and confidentiality of records of occupational injury and disease
- provision of information and training
- regulations and codes of practice relating to hazards present in work area
- health and safety representatives
- OHS committees
- issue resolution.

**Workplace procedures may include:**

- inspection and evaluation
- housekeeping
- consultation processes (either general or specific to OHS)
- changes to procedures
- resource management/sustainable practice
- training and assessment
- specific hazard policies and procedures including public safety procedures, OHS information, OHS record keeping and reporting, maintenance of plant and equipment, purchasing of supplies and equipment, and counselling and disciplinary processes.

**Hazardous events may include:**

- accidents
- emergencies such as fires, chemical spills or bomb scares.

**Hierarchy of control refers to:**

- preferred order of risk control measures.

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## **Unit Sector(s)**

**Unit Sector**

Common Units

Hidden text

## **Competency field**

**Competency Field**

## **co-requisite unit/s**

**Co-requisite Unit/s**

## **LGAWORK404A Manage a civil works project**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

This unit covers managing a civil works project within council areas. The unit addresses all aspects of planning, implementing and monitoring a civil works project through to completion, including the documentation required to support the project.

### **Application of the Unit**

#### **Application of the Unit**

This unit supports the attainment of skills and knowledge required for competent workplace performance in councils of all sizes and in varying locations. Knowledge of the legislation and regulations that provide the boundaries for the operation of civil works in councils is essential. The unit is particularly appropriate for staff responsible for supervising civil works projects and ensuring project outcomes are met.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

#### **Prerequisite Unit/s**

## Employability Skills Information

**Employability Skills** 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 required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Evaluate and assess the project	1.1.A site evaluation is organised and undertaken to determine scope of project. 1.2.Work scope, desired outcomes and key dates are identified and recorded according to relevant legislation and standards . 1.3.Required resources are identified and their availability is determined.
2. Plan and document the project	2.1.Tasks associated with the project are identified and documented. 2.2.The preparation of technical specifications is coordinated and managed to completion within the required time frame. 2.3.An overview plan is prepared, distributed and reviewed by key stakeholders. 2.4.Contingency plans are developed to ensure that delays in completing the project are addressed as early as possible. 2.5.Effective and efficient communication strategies are developed and documented to meet the needs of project stakeholders and service providers.
3. Prepare for project implementation	3.1.A workforce with required numbers and skills is established and fully briefed as to job requirements and planned time frame. 3.2.Priorities are organised to ensure agreed time frame is met. 3.3.Resources are ordered and arrangements are initiated to ensure delivery to site in accordance with planned time frame. 3.4.Project plan and schedule are drawn up, reviewed and amended where necessary.
4. Implement the project plan	4.1.A workforce with required numbers and skills is established and fully briefed as to job requirements and planned time frame. 4.2.Priorities are organised to ensure agreed time frame is met. 4.3.Resources are ordered and arrangements are initiated to ensure delivery to site in accordance with planned time frame. 4.4.Project plan and schedule are drawn up, reviewed and amended where necessary.

**ELEMENT**

**PERFORMANCE CRITERIA**

**5. Monitor the project**

- 5.1. Project is regularly reviewed against project plan in relation to safety, quality, resources, time frames, costs and equipment.
- 5.2. Deviations from the project plan are identified and actions are taken to recover original project program.
- 5.3. Deviations from original program requirements are reported to the appropriate personnel and direction is sought where necessary.

**6. Complete documentation**

- 6.1. Quality assurance documents and reports are provided in accordance with statutory, organisation or site requirements.
- 6.2. Plant and maintenance records are maintained in accordance with occupational health and safety (OHS) requirements.
- 6.3. Project completion is reviewed against the established plan and opportunities for future improvement are established and documented.

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## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit

#### **Required Skills**

- contingency management
- applying quality assurance and quality control procedures
- identifying sources of errors
- coordinating work scope
- priority management and organisational skills
- leadership and management skills
- communication
- time management
- resource management
- project management
- using construction equipment and materials
- conducting mathematical calculations relevant to civil construction works.

#### **Required Knowledge**

- relevant OHS regulations
- relevant statutory legislation and codes of practice
- relevant site safety procedures
- environmental awareness and procedures
- location of relevant plant and equipment
- quality assurance and control procedures
- plant and related systems
- contractual procedures
- project management principles and concepts
- work scope coordination and preparation
- human resource management principles
- civil construction knowledge and experience
- survey methodologies
- mathematical calculations relevant to planning and implementing civil works constructions.

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## Evidence Guide

### EVIDENCE GUIDE

#### Overview of assessment requirements

A person who demonstrates competency in this unit will be able to perform the outcomes described in the Elements to the required performance level detailed in the Performance Criteria. The knowledge and skill requirements described in the Range Statement must also be demonstrated. For example, knowledge of the legislative framework and safe work practices that underpin the performance of the unit must be demonstrated.

#### Critical aspects of evidence to be considered

The demonstrated ability to:

- develop, implement and review detailed and thorough project plans in relation to civil works completed for council
- forecast, plan for and manage contingencies to ensure project outcomes are met within agreed time frames
- document accurately all project details according to legislative requirements and council standards
- ensure compliance with all legislative and regulatory requirements including observance of OHS legislation.

#### Context of assessment

Competency is demonstrated by performance of all stated criteria, with particular attention to the critical aspects of evidence and the knowledge and skills elaborated in the Evidence Guide, and within the scope of the Range Statement.

Assessment must take account of the endorsed Assessment Guidelines in the Local Government Training Package.

Assessment of the performance requirements in this unit should be undertaken in an actual workplace or simulated environment.

Assessment should reinforce the integration of the key competencies for the particular AQF level. Refer to the key competency levels at the end of this unit.

#### Relationship to other units (prerequisite or co-requisite units)

To enable holistic assessment this unit may be assessed with other units that form part of the job role.

#### Method of assessment

The following assessment methods are suggested:

- observation of the learner performing a range of workplace tasks over sufficient time to demonstrate handling of a range of contingencies
- written and/or oral questioning to assess knowledge and

## EVIDENCE GUIDE

	<p>understanding</p> <ul style="list-style-type: none"><li>• completion of workplace documentation</li><li>• third-party reports from experienced practitioners</li><li>• completion of self-paced learning materials including personal reflection and feedback from trainer, coach or supervisor.</li></ul>
<b>Evidence required for demonstration of consistent performance</b>	Evidence should be collected over a set period of time that is sufficient to include an appropriate range and variety of situations.
<b>Resource implications</b>	The learner and trainer should have access to appropriate documentation and resources normally used in the workplace.

## Range Statement

### 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 in the Performance Criteria is detailed below.

**Relevant legislation and standards may include:**

- OHS
- quality assurance, including relevant Australian standards
- environmental legislation
- council regulations and by-laws

**Resources may include:**

- materials
- plant
- equipment, including specialist equipment
- tools
- finances
- specialist contractors and personnel

**Contingency plans may need to consider:**

- weather changes
- worker injuries or illnesses
- worker absences
- supply breakdowns
- machinery failures

**Documentation may include:**

- job cards
- budgets
- cost centres
- check sheets
- safety rule procedures
- plant records
- drawings
- quality assurance procedures and documentation
- maintenance procedures
- codes of practice
- contract specifications.

**Communication strategies may include:**

- regular meetings with clients
- regular meetings with field staff.

**Service providers may include:**

- internal staff
- contractors
- contract specialists.

**Project plans may be drawn using:**

- Gantt charts
- PERT charts.

**RANGE STATEMENT**

Hidden text

**Unit Sector(s)**

**Unit Sector**                      Operational Works

Hidden text

**Competency field**

**Competency Field**

**co-requisite unit/s**

**Co-requisite Unit/s**

## **LGAWORK405A Plan and supervise roadworks**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

This unit covers planning and supervising manual and mechanical operations undertaken to maintain or repair roads within council areas. It covers the identification and application of appropriate materials for particular roadworks. The unit is appropriate for supervisors and team leaders of council roadworks.

### **Application of the Unit**

#### **Application of the Unit**

This unit supports the attainment of skills and knowledge required for competent workplace performance in councils of all sizes. Knowledge of the legislation, codes and regulations that provide the boundaries for the operation of council roadworks is essential. The ability to use appropriate materials, construction methods and processes and adhere to relevant standards must be demonstrated.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

#### **Prerequisite Unit/s**



## Employability Skills Information

**Employability Skills** 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 required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<p>1. <b>Plan and prepare for roadworks and maintenance</b></p>	<p>1.1. Requests for roadworks are received and prioritised.</p> <p>1.2. Site of roadworks and cause of defect are assessed to determine required materials, resources and safety precautions.</p> <p>1.3. Quality assurance requirements are identified and incorporated into preparation for roadworks.</p> <p>1.4. Traffic management requirements are assessed and adequate notification to the public of future roadworks and expected delays is arranged.</p> <p>1.5. Work schedules are established outlining required equipment, resources, materials and optimum timing to complete works.</p> <p>1.6. Appropriate plans, specifications or drawings are referred to, to ensure quality assurance is adhered to and maintained.</p>
<p>2. <b>Evaluate road construction materials</b></p>	<p>2.1. Type and quantity of construction or repair materials are determined and delivery to site is arranged in accordance with established work schedule.</p> <p>2.2. Required pre-mix and hot-mix materials are identified to suit job requirements.</p> <p>2.3. Impurities in raw and processed materials are identified and recorded in accordance with council and quality assurance requirements.</p> <p>2.4. Appropriate type of repair and repair material is recommended for defective road surfaces .</p> <p>2.5. Manufacture and testing of all materials are conducted and recorded in accordance with appropriate Australian standards.</p>
<p>3. <b>Supervise road construction and repair work</b></p>	<p>3.1. Appropriately skilled workforce is selected and scheduled to conduct roadwork.</p> <p>3.2. Job specifications and required tasks are communicated effectively to scheduled workforce.</p> <p>3.3. Road construction or repair work is monitored to ensure it satisfies quality assurance requirements and relevant legislation.</p> <p>3.4. On-site occupational health and safety (OHS) requirements are monitored and observed at all times.</p> <p>3.5. Emergency equipment is in working order and available at the work site.</p> <p>3.6. Contingencies are managed to ensure quality of roadworks is maintained and work is completed within</p>

**ELEMENT**

**PERFORMANCE CRITERIA**

**4. Monitor  
environmental  
impact of roadworks**

agreed time frames.

4.1. Site drainage requirements are assessed in accordance with legislative requirements.

4.2. Quality of drainage water and run-off from the site is monitored to ensure compliance with legislation.

4.3. Issues relating to damage from environmental impact are identified and processes are implemented to prevent or minimise impact.

4.4. Reinstatement of the surrounding environment is planned and carried out in accordance with relevant legislation.

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## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit

#### **Required Skills**

- interpreting, applying and communicating technical information
- problem solving
- contingency planning and management
- interpreting technical drawings and site plans
- supervisory and leadership skills
- communication
- project management
- time management
- organisation
- working under pressure and within time constraints
- using construction equipment
- using surveying equipment, including optical square, clinometer, dumpy level, tilting level, automatic level, change plates, laser level and laser plane.

#### **Required Knowledge**

- site and equipment safety requirements
- appropriate state or territory legislation, regulations and codes
- quality assurance procedures relevant to roadworks
- equipment characteristics, technical capabilities and limitations
- manual handling techniques used in accordance with WorkSafe standards
- roadwork activity procedures
- basic geological and technical data
- diagnostic techniques
- properties, characteristics and uses of various road construction or repair materials
- relevant survey methodologies and calculations.

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## Evidence Guide

### EVIDENCE GUIDE

#### Overview of assessment requirements

A person who demonstrates competency in this unit will be able to perform the outcomes described in the Elements to the required performance level detailed in the Performance Criteria. The knowledge and skill requirements described in the Range Statement must also be demonstrated. For example, knowledge of the legislative framework and safe work practices that underpin the performance of the unit must be demonstrated.

#### Critical aspects of evidence to be considered

The demonstrated ability to:

- comply with OHS regulations applicable to workplace operations and consistent with state or territory legislative requirements
- communicate roadworks information clearly to team members and others
- plan and supervise safe work practices in a range of environments
- understand emergency procedures and appropriate responses
- transfer skills to changing circumstances and environmental conditions
- provide job specifications to maintain sealed roads.

#### Context of assessment

Competency is demonstrated by performance of all stated criteria, with particular attention to the critical aspects of evidence and the knowledge and skills elaborated in the Evidence Guide, and within the scope of the Range Statement.

Assessment must take account of the endorsed Assessment Guidelines in the Local Government Training Package.

Assessment of the performance requirements in this unit should be undertaken in an actual workplace or simulated environment.

Assessment should reinforce the integration of the key competencies for the particular AQF level. Refer to the key competency levels at the end of this unit.

#### Relationship to other units (prerequisite or co-requisite units)

To enable holistic assessment this unit may be assessed with other units that form part of the job role.

This unit of competency is dependent upon acquiring relevant prerequisite underpinning knowledge in the road construction industry.

## EVIDENCE GUIDE

### Method of assessment

Competency should be assessed through direct simulated or actual workplace activities and questions related to underpinning knowledge.

Competency in this unit may be determined concurrently, based upon project work.

Competency may be assessed while work is undertaken under limited guidance, checking at various stages of the process and at the completion of the activity against the Performance Criteria and specifications.

### Evidence required for demonstration of consistent performance

Evidence should be collected over a set period of time that is sufficient to include an appropriate range and variety of situations.

### Resource implications

- interpreting, applying and communicating technical information
- problem solving
- contingency planning and management
- interpreting technical drawings and site plans
- supervisory and leadership skills
- communication
- project management
- time management
- organisation
- working under pressure and within time constraints
- using construction equipment
- using surveying equipment, including optical square, clinometer, dumpy level, tilting level, automatic level, change plates, laser level and laser plane.

## Range Statement

### 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 in the Performance Criteria is detailed below.

<b>Roadworks activities may include:</b>	<ul style="list-style-type: none"> <li>• rectifying imperfections in road surfaces (e.g. potholes)</li> <li>• new road constructions</li> <li>• existing road reconstructions</li> <li>• work on different road types, including asphalt, bitumen, dirt or gravel.</li> </ul>
<b>Notification to the public may require:</b>	<ul style="list-style-type: none"> <li>• monitoring traffic volumes</li> <li>• advertisements in local newspapers</li> <li>• signage in the area of planned roadworks.</li> </ul>
<b>Materials may include:</b>	<ul style="list-style-type: none"> <li>• bituminous mixes</li> <li>• asphalt</li> <li>• gravel.</li> </ul>
<b>Drawings may include:</b>	<ul style="list-style-type: none"> <li>• site plans and detailed plans</li> <li>• roadworks</li> <li>• plans of subdivision</li> <li>• earthworks.</li> </ul>
<b>Surfaces may include:</b>	<ul style="list-style-type: none"> <li>• haul roads</li> <li>• formed or prepared roads, including highways, arterial roads, residential streets and secondary roads</li> <li>• access roads</li> <li>• pads.</li> </ul>
<b>Emergency equipment may include:</b>	<ul style="list-style-type: none"> <li>• firefighting equipment</li> <li>• medical and first aid kits</li> <li>• personal protective clothing and equipment.</li> </ul>
<b>Contingencies may include:</b>	<ul style="list-style-type: none"> <li>• weather changes</li> <li>• worker injuries or illnesses</li> <li>• worker absences</li> <li>• supply breakdowns</li> <li>• machinery failures.</li> </ul>

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## **Unit Sector(s)**

**Unit Sector** Operational Works

Hidden text

## **Competency field**

**Competency Field**

## **co-requisite unit/s**

**Co-requisite Unit/s**



## **LGAWORK406A Supervise concrete works**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

This unit covers supervising construction works using concrete. It requires candidates to be able to assess concrete materials in their raw and finished states, identify and evaluate the characteristics of different concrete types, identify defects and impurities in concrete and understand the effect of impurities in concrete. It is appropriate for supervisors of concrete constructions.

### **Application of the Unit**

#### **Application of the Unit**

This unit supports the attainment of skills and knowledge required for competent workplace performance in councils of all sizes. Knowledge of the relevant legislation, codes and regulations applicable to council construction works is required. The ability to apply materials knowledge, to source appropriate raw materials and to apply relevant testing methods to raw materials and finished concrete structures must be demonstrated.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

#### **Prerequisite Unit/s**

## Employability Skills Information

**Employability Skills** 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 required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<p>1. <b>Monitor assessment of construction materials</b></p>	<p>1.1. Plastic and hardened concrete properties are identified and recorded in accordance with relevant standards .</p> <p>1.2. Types of hydraulic cement are identified.</p> <p>1.3. Sources of aggregate are identified and listed, and properties of each are identified.</p> <p>1.4. Any impurities in raw materials are identified and documented in accordance with relevant standards and quality assurance standards.</p> <p>1.5. Raw materials used to make concrete and concrete constructions are tested to ensure quality of finished product.</p>
<p>2. <b>Supervise the handling and placement of concrete</b></p>	<p>2.1. The effect of site access on the selection and distribution method of concrete is evaluated and documented.</p> <p>2.2. Methods of distribution of concrete are listed and documented in accordance with legislative and organisational requirements.</p> <p>2.3. Correct placement of level slabs, sloping slabs and vertical walls is ensured by monitoring field staff.</p> <p>2.4. Reasons for, and effects of, compaction on plastic and hardened concrete are identified and listed.</p> <p>2.5. Defects in concrete due to incorrect placement are identified and documented accordingly.</p> <p>2.6. Finishing process and surface treatments to slab concrete are monitored and documented.</p> <p>2.7. Accurate curing methods are observed and documented.</p>
<p>3. <b>Identify faults in concrete and repair methods</b></p>	<p>3.1. Repair methods for cracked concrete are established.</p> <p>3.2. Causes of concrete faults are identified and documented accordingly.</p> <p>3.3. Field staff members are instructed to repair identified faults in concrete.</p>
<p>4. <b>Maintain accurate records</b></p>	<p>4.1. Daily diary of work undertaken and observed is updated and maintained regularly in accordance with relevant standards and organisational requirements.</p> <p>4.2. Directions given to relevant personnel are recorded accurately.</p> <p>4.3. Changes or alterations to scheduled work activities are documented accurately and communicated to relevant personnel.</p>

**ELEMENT**

**PERFORMANCE CRITERIA**

Hidden text

**Required Skills and Knowledge**

**REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit

**Required Skills**

- placing and handling concrete and cement
- construction
- supervisory and leadership skills
- communication
- literacy and numeracy skills
- time management
- priority management
- planning and organising
- contingency management
- reading plans and calculating measurements.

**Required Knowledge**

- interpretation of reports, working drawings and specifications
- nature of materials and effect of performance
- relevant national, state or territory legislation and local government policies and procedures
- OHS requirements relevant to civil construction and operational works
- civil construction requirements
- methods of testing raw materials.

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## Evidence Guide

### EVIDENCE GUIDE

#### Overview of assessment requirements

A person who demonstrates competency in this unit will be able to perform the outcomes described in the Elements to the required performance level detailed in the Performance Criteria. The knowledge and skill requirements described in the Range Statement must also be demonstrated. For example, knowledge of the legislative framework and safe work practices that underpin the performance of the unit must be demonstrated.

#### Critical aspects of evidence to be considered

Comply with occupational health and safety (OHS) regulations applicable to workplace operations.

Research, interpret, apply and communicate technical information.

#### Context of assessment

Competency is demonstrated by performance of all stated criteria, with particular attention to the critical aspects of evidence and the knowledge and skills elaborated in the Evidence Guide, and within the scope of the Range Statement.

Assessment must take account of the endorsed Assessment Guidelines in the Local Government Training Package.

Assessment of the performance requirements in this unit should be undertaken in an actual workplace or simulated environment.

Assessment should reinforce the integration of the key competencies for the particular AQF level. Refer to the key competency levels at the end of this unit.

#### Relationship to other units (prerequisite or co-requisite units)

To enable holistic assessment this unit may be assessed with other units that form part of the job role.

#### Method of assessment

The following assessment methods are suggested:

- observation of the learner performing a range of workplace tasks over sufficient time to demonstrate handling of a range of contingencies
- written and/or oral questioning to assess knowledge and understanding
- completion of workplace documentation
- third-party reports from experienced practitioners
- completion of self-paced learning materials including personal reflection and feedback from trainer, coach or supervisor.

## EVIDENCE GUIDE

### Evidence required for demonstration of consistent performance

Evidence should be collected over a set period of time that is sufficient to include an appropriate range and variety of situations.

### Resource implications

The learner and trainer should have access to appropriate documentation and resources normally used in the workplace.

## Range Statement

### 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 in the Performance Criteria is detailed below.

### Relevant standards may include:

- industry standard specifications
- council standards
- relevant Australian standards
- quality assurance standards.

### Identifying concrete properties may include:

- admixtures, including air entraining agents, set controlling types and water reducing types
- testing of mix design, including selected applications using statistics, aggregate grading and first principles
- recognising principles of reinforced concrete utilising steel, wire and fibres.

### Curing methods may include:

- impermeable membrane curing
- continuously wetting concrete
- accelerated curing.

### Methods of testing raw materials and types of concrete may include:

- Texas ball mill test
- California bearing ratio test
- slump test
- destructive compression tests.

### Relevant personnel may include:

- field staff
- contractors
- management
- office or administration staff.

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## **Unit Sector(s)**

**Unit Sector** Operational Works

Hidden text

## **Competency field**

**Competency Field**

## **co-requisite unit/s**

**Co-requisite Unit/s**

# **LGAWORK501A Prepare preliminary design for operational works**

## **Modification History**

Not applicable.

## **Unit Descriptor**

**Unit Descriptor** This unit covers preparing works related to preliminary design for community consultation and council approval.

## **Application of the Unit**

**Application of the Unit** This unit supports the attainment of skills and knowledge required for competent workplace performance in councils of all sizes. Knowledge of the legislation and regulations within which councils must operate is essential. The unique nature of councils, as a tier of government directed by elected members and reflecting the needs of local communities, must be appropriately reflected.

## **Licensing/Regulatory Information**

Not applicable.

## **Pre-Requisites**

**Prerequisite Unit/s**

## **Employability Skills Information**

**Employability Skills** 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 required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

## Elements and Performance Criteria

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
1. <b>Establish design criteria</b>	1.1. Project objectives are defined so that the preliminary design can address required outcomes. 1.2. Regulations and restrictions on design are identified to ensure design meets relevant standards and codes. 1.3. The physical dimensions of the project are specified to enable the design to proceed. 1.4. An appropriate level of design detail is established to enable a preliminary design to be prepared.
2. <b>Prepare alternative concepts</b>	2.1. Similar projects are examined to build on existing knowledge and improve efficiency. 2.2. Feasible concept layouts and supporting statements are prepared that satisfy design objectives within design parameters. 2.3. Alternative concepts are prepared with supporting statements. 2.4. Indicative cost estimates are prepared.
3. <b>Conduct a safety design audit</b>	3.1. Agents or authorities relevant to the design are identified. 3.2. A safety design audit is conducted. 3.3. Safety design audit feedback is incorporated into the preliminary design.
4. <b>Obtain project approvals</b>	4.1. Relevant utilities that are to be affected, or whose assistance is required, are notified. 4.2. Necessary approvals and permits from relevant authorities are obtained.
5. <b>Finalise public consultation and prepare report to council</b>	5.1. An accurate preliminary design report is prepared. 5.2. Consultation opportunities are provided for interested parties to view plan. 5.3. Public feedback is reported in accordance with statutory and legislative requirements. 5.4. Modifications are made to incorporate amendments, and design criteria are adjusted accordingly. 5.5. Final concept plan is submitted to council.

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## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit

#### **Required Skills**

- preparing preliminary design to meet specifications
- interpreting relevant government legislation and council policies
- presenting material to council and customers
- computer application of design aid
- interpreting plans, maps, level sheets and specifications
- chart reading
- financial estimations and alternate concepts.

#### **Required Knowledge**

- relevant government authorities and council procedures and policies
- relevant legislation, codes of practice and standards
- contractual and legal requirements
- environmental management strategy
- design standards.

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## Evidence Guide

### EVIDENCE GUIDE

#### Overview of assessment requirements

A person who demonstrates competency in this unit will be able to perform the outcomes described in the Elements to the required performance level detailed in the Performance Criteria. The knowledge and skill requirements described in the Range Statement must also be demonstrated. For example, knowledge of the legislative framework and safe work practices that underpin the performance of the unit must be demonstrated.

#### Critical aspects of evidence to be considered

Australian design standards are applied.

Review of environmental factors for maintenance and construction projects is conducted.

Safety design audit is undertaken.

#### Context of assessment

May be assessed through:

- on the job
- simulated workplace environment
- written assignment
- short-answer test
- oral questioning
- observation
- or any combination of the above.

#### Relationship to other units (prerequisite or co-requisite units)

To enable holistic assessment this unit may be assessed with other units that form part of the job role.

#### Method of assessment

The following assessment methods are suggested:

- observation of the learner performing a range of workplace tasks over sufficient time to demonstrate handling of a range of contingencies
- written and/or oral questioning to assess knowledge and understanding
- completion of workplace documentation
- third-party reports from experienced practitioners
- completion of self-paced learning materials including personal reflection and feedback from trainer, coach or supervisor.

#### Evidence required for demonstration of consistent performance

Evidence will need to be gathered over time across a range of variables.

## EVIDENCE GUIDE

### Resource implications

In accordance with a range of variable requirements.

## Range Statement

### 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 in the Performance Criteria is detailed below.

#### Alternative concepts may include:

- visuals
- environment
- design
- style
- cost.

#### Cost estimates may include:

- review of existing project costs
- industry journals
- contractor quotes
- cost assessors
- estimating and quantity surveying firms
- data services.

#### Agents or authorities may include:

- service providers (gas, water, electricity, utilities and communications)
- environment protection authorities
- planning bodies
- state road authorities
- community organisations.

#### Design may include:

- erosion and sediment control plan references
- Australian design standards.

Hidden text

## **Unit Sector(s)**

**Unit Sector** Operational Works

Hidden text

## **Competency field**

**Competency Field**

## **co-requisite unit/s**

**Co-requisite Unit/s**

## LGAWORK502A Prepare detailed works project documentation

### Modification History

Not applicable.

### Unit Descriptor

**Unit Descriptor** This unit covers preparing relevant project documentation including specifications, key invoices and estimates.

### Application of the Unit

**Application of the Unit** This unit supports the attainment of skills and knowledge required for competent workplace performance in councils of all sizes. Knowledge of the legislation and regulations within which councils must operate is essential. The unique nature of councils, as a tier of government directed by elected members and reflecting the needs of local communities, must be appropriately reflected.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

**Prerequisite Unit/s**

### Employability Skills Information

**Employability Skills** 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 required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.



## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. <b>Prepare design program</b>	1.1.Design elements are listed to determine the scope and purpose of the design. 1.2.Time constraints and financial limitations are identified. 1.3.Appropriate technical, physical and human resources are assigned to the project. 1.4.Complementary works are identified to enable an efficient design program to be prepared.
2. <b>Undertake design and prepare working drawings</b>	2.1.Available information is reviewed and specifications are identified. 2.2.Design manuals are used to ensure the design complies with all statutory and council requirements . 2.3.Working drawings that comply with the design brief are prepared and recorded.
3. <b>Prepare work specifications</b>	3.1.Complete and detailed works specifications are prepared at a level consistent with council and relevant standards. 3.2.Quality assurance methods are applied to the preparation of works specifications. 3.3.Works specifications are prepared that complement working drawings. 3.4.Works specifications provide detail on methods, standards, materials, products and contractors as applicable.
4. <b>Prepare detailed estimate</b>	4.1.Detail drawings are utilised to prepare an accurate bill of quantities. 4.2.Competitive rates for provision of materials and services are obtained. 4.3.Primary cost items are specified and costed. 4.4.An estimate for contingencies is made within prepared estimates. 4.5.The cost of project support resources is included in detailed estimates.

Hidden text

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit

#### Required Skills

- interpreting relevant acts, regulations, codes, policies, procedures and standards
- interpreting engineering design criteria
- engineering drafting
- calculating weight, volume, ratio and quantity.

#### Required Knowledge

- federal and state government acts
- local government regulations
- design standards and specifications
- drawing standards and specifications
- interpretation and analysis of resources costing.

Hidden text

## Evidence Guide

### EVIDENCE GUIDE

<b>Overview of assessment requirements</b>	A person who demonstrates competency in this unit will be able to perform the outcomes described in the Elements to the required performance level detailed in the Performance Criteria. The knowledge and skill requirements described in the Range Statement must also be demonstrated. For example, knowledge of the legislative framework and safe work practices that underpin the performance of the unit must be demonstrated.
<b>Critical aspects of evidence to be considered</b>	A range of design criteria is included. Drawings are undertaken to meet established standards. Works specifications are prepared. Estimates are detailed and include contingencies.
<b>Context of assessment</b>	May be assessed through: <ul style="list-style-type: none"> <li>• on the job</li> <li>• simulated workplace environment</li> <li>• written assignment</li> <li>• short-answer test</li> <li>• oral questioning</li> <li>• observation</li> <li>• or any combination of the above.</li> </ul>
<b>Relationship to other units(prerequisite or co-requisite units)</b>	To enable holistic assessment this unit may be assessed with other units that form part of the job role.
<b>Method of assessment</b>	The following assessment methods are suggested: <ul style="list-style-type: none"> <li>• observation of the learner performing a range of workplace tasks over sufficient time to demonstrate handling of a range of contingencies</li> <li>• written and/or oral questioning to assess knowledge and understanding</li> <li>• completion of workplace documentation</li> <li>• third-party reports from experienced practitioners</li> <li>• completion of self-paced learning materials including personal reflection and feedback from trainer, coach or supervisor.</li> </ul>
<b>Evidence required for demonstration of</b>	Evidence will need to be gathered over time across a range of variables.

**EVIDENCE GUIDE**

**consistent performance**

**Resource implications**

In accordance with a range of variable requirements.

**Range Statement**

**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 in the Performance Criteria is detailed below.

**Design manuals may include:**

- building regulations
- Australian standards
- state road authority
- design manuals
- Austroad design manuals
- reference texts
- council or authority standards
- quality assurance manuals
- water and sewerage authority and design or industry standards.

**Complementary works may include:**

- other works that can be carried out effectively and cost efficiently whilst resources are available.

**Contingencies may include:**

- weather conditions
- industrial relations
- latent conditions
- additional supervision
- variation in materials cost and availability.

**Estimates may include:**

- day labour
- contract labour.

**Council requirements may include:**

- works specifications
- design procedures.

Hidden text

## **Unit Sector(s)**

**Unit Sector** Operational Works

Hidden text

## **Competency field**

**Competency Field**

## **co-requisite unit/s**

**Co-requisite Unit/s**

## LGAWORK503A Undertake project investigation

### Modification History

Not applicable.

### Unit Descriptor

**Unit Descriptor** This unit covers undertaking the research of a works project to determine scope and relevant stakeholders.

### Application of the Unit

**Application of the Unit** This unit supports the attainment of skills and knowledge required for competent workplace performance in councils of all sizes. Knowledge of the legislation and regulations within which councils must operate is essential. The unique nature of councils, as a tier of government directed by elected members and reflecting the needs of local communities, must be appropriately reflected.

### Licensing/Regulatory Information

Not applicable.

### Pre-Requisites

**Prerequisite Unit/s**

### Employability Skills Information

**Employability Skills** 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 required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

## Elements and Performance Criteria

### ELEMENT

### PERFORMANCE CRITERIA

1. **Determine parameters of project**

- 1.1. Preliminary scope of project is confirmed and reviewed to ensure parameters meet current requirements .
- 1.2. Detailed design parameters are specified to enable a complete design brief to be prepared.

2. **Obtain information on existing conditions**

- 2.1. Surveys of existing conditions are undertaken that are relevant to the proposed works and that impact on the design parameters.
- 2.2. Liaison with relevant statutory authorities and affected parties is undertaken to ensure works can be coordinated.
- 2.3. The impact of works on existing assets and the environment is assessed through liaison with relevant and affected parties.

3. **Prepare existing conditions plan**

- 3.1. An accurate, existing conditions plan is prepared from all collated data to enable a detailed design to proceed.
- 3.2. An existing conditions plan is produced within regulatory and accepted drafting standards .

Hidden text

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

This describes the essential skills and knowledge and their level, required for this unit

#### **Required Skills**

- interpersonal communication techniques
- time management
- risk management
- high level negotiation skills
- presenting plans
- collating data
- research expertise.

#### **Required Knowledge**

- assets network
- design and drafting principles
- related government bodies
- contractual requirements
- acts, regulations, standards and codes of practice
- council budget cycle.

Hidden text



## Evidence Guide

### EVIDENCE GUIDE

<b>Overview of assessment requirements</b>	A person who demonstrates competency in this unit will be able to perform the outcomes described in the Elements to the required performance level detailed in the Performance Criteria. The knowledge and skill requirements described in the Range Statement must also be demonstrated. For example, knowledge of the legislative framework and safe work practices that underpin the performance of the unit must be demonstrated.
<b>Critical aspects of evidence to be considered</b>	Liaison with council and other customers is undertaken. Design parameters are identified. Impact of project on assets and environment is identified.
<b>Context of assessment</b>	May be assessed through: <ul style="list-style-type: none"> <li>• on the job</li> <li>• simulated workplace environment</li> <li>• written assignment</li> <li>• short-answer test</li> <li>• oral questioning</li> <li>• observation</li> <li>• or any combination of the above.</li> </ul>
<b>Relationship to other units (prerequisite or co-requisite units)</b>	To enable holistic assessment this unit may be assessed with other units that form part of the job role.
<b>Method of assessment</b>	The following assessment methods are suggested: <ul style="list-style-type: none"> <li>• observation of the learner performing a range of workplace tasks over sufficient time to demonstrate handling of a range of contingencies</li> <li>• written and/or oral questioning to assess knowledge and understanding</li> <li>• completion of workplace documentation</li> <li>• third-party reports from experienced practitioners</li> <li>• completion of self-paced learning materials including personal reflection and feedback from trainer, coach or supervisor.</li> </ul>
<b>Evidence required for demonstration of consistent performance</b>	Evidence will need to be gathered over time across a range of variables.

## EVIDENCE GUIDE

### Resource implications

In accordance with a range of variable requirements.

## Range Statement

### 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 in the Performance Criteria is detailed below.

**Requirements may include:**

- budget
- project scope
- facilities
- regulations
- user group needs
- life cycle costing
- environment management.

**Surveys may include:**

- traffic counts
- topographical survey
- features survey
- historical review
- title boundaries
- local knowledge
- levels survey
- cross-sectional
- people opinion survey
- detailing and locating services such as gas, water, electricity and telecommunications.

**Drafting standards may include:**

- Australian standards code for building and engineering AS1100 - technical drawing
- council requirements
- council policies and standards.

**Stakeholders may include:**

- community groups
- related government bodies and authorities
- internal council sections.

**Relevant authorities may include:**

- roads and traffic authorities
- gas
- electricity
- other utilities.

**Affected parties may include:**

- business
- community groups
- residents.

Hidden text

## **Unit Sector(s)**

**Unit Sector** Operational Works

Hidden text

## **Competency field**

**Competency Field**

## **co-requisite unit/s**

**Co-requisite Unit/s**

## MEM30027A Prepare basic programs for programmable logic controllers

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	This unit covers writing, testing, editing and monitoring programs using a hand program loader.
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### Application of the Unit

<b>Application of the unit</b>	This unit applies to all fields of engineering and manufacturing. Work is done under supervision.  <b>Band: 0</b> <b>Unit Weight: 0</b>
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### Licensing/Regulatory Information

Not Applicable

### 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
1. Write and test basic programs using a hand program loader	1.1. Programs are written in accordance with programming rules. 1.2. Programs are loaded into a PLC. 1.3. Programs are verified with a supervisor. 1.4. The operation of programs is tested with assistance from a supervisor.
2. Edit and monitor basic programs using a hand program loader	2.1. The monitoring function is used to verify circuit conditions and check the current values of timers and counters. 2.2. Editing features are used to make minor program changes.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

Look for evidence that confirms skills in:

- communicating
- planning
- assessing
- problem solving
- analysing
- reading and interpreting engineering specifications, standard operating procedures and other applicable reference documents
- organising information
- using numeral operations, geometry and calculations/formulae within the scope of this unit
- checking for conformance to specifications
- planning and sequencing operations
- checking and clarifying task-related information

#### Required knowledge

Look for evidence that confirms knowledge of:

**REQUIRED SKILLS AND KNOWLEDGE**

- hazards and control measures associated with preparing basic programs for PLC, including housekeeping
- safe work practices and procedures
- General knowledge of programmable controllers including:
  - basic PLC operation: definitions, terminology and block diagrams; scan cycle
  - basic programming rules; addressing for I/O; halt; run
  - programming (using a hand programmer): flowcharts/steps to use when programming; clearing of memory; ladder format
  - Boolean/mnemonic/statement list format; series circuits; parallel circuits; latching circuits; stack register operation; combination series/parallel circuits; inversion elements; timers
  - counters; monitoring of discrete I/O and timer/counter values; edit (insert and delete elements)
- connection of discrete input and output devices to a PLC



## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	<p>A person who demonstrates competency in this unit must be able to prepare basic programs for programmable logic controllers.</p>
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.</p>
<b>Context of and specific resources for assessment</b>	<p>This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.</p> <p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing basic programs for programmable logic controllers, or other units requiring the exercise of the skills and knowledge covered by this unit.</p>
<b>Method of assessment</b>	<p>Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.</p>
<b>Guidance information for</b>	

**EVIDENCE GUIDE**

<b>assessment</b>	
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**Range Statement****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.

**Programs**

<b>Programs</b>	Includes series elements, parallel elements, combination series parallel elements, basic timers and counters
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**Unit Sector(s)**

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

<b>Co-requisite units</b>		

## Competency field

Competency field	Engineering technician
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## MSACMT461A Facilitate SCADA systems in a manufacturing team or work area

### Modification History

Not applicable.

### Unit Descriptor

<b>Unit descriptor</b>	This unit covers the knowledge and skills required by a person who is required to use System Control and Data Acquisition (SCADA), or other similar systems, and support the team in their use of SCADA.
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### Application of the Unit

<b>Application of the unit</b>	<p>In a typical scenario, an organisation will be using SCADA. The person will access the SCADA system for their own work, but will also need to provide support and organise skill development programs for their team members.</p> <p>This competency is also relevant to maintenance personnel using a SCADA system to coordinate maintenance activities.</p> <p>This unit primarily requires the application of skills associated with using communication technology and supporting team use of SCADA systems. Problem solving, initiative and enterprise, and planning and organisational skills are required to ensure that system is used efficiently. This requires aspects of learning and self management to ensure own performance and that of the team.</p>
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### Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

<b>Prerequisite units</b>	<i>MSACMT261A</i>	<i>Use SCADA systems in manufacturing</i>
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## 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
1. Communicate using the SCADA system	1.1. Send and receive information using SCADA 1.2. Send and receive messages using SCADA
2. Make decisions using SCADA	2.1. Interrogate the SCADA system to find required current, historical or predicted information 2.2. Take actions appropriate to the information
3. Monitor the use of SCADA	3.1. Routinely monitor SCADA information and use along the <i>value chain</i> 3.2. Identify poor uses of SCADA system within team and system inadequacies 3.3. Identify team members who require additional support 3.4. Take appropriate action to provide required support 3.5. Take appropriate action to improve SCADA system and its use
4. Support team use SCADA	4.1. Regularly communicate with team, both using SCADA based communication and face to face 4.2. Identify system improvements required 4.3. Identify skill improvement needs 4.4. Take appropriate actions to have the identified improvements implemented

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills:

- keyboarding/mousing
- communication
- teamwork
- problem solving.
- planning and organising

#### Required knowledge:

- hierarchy of SCADA system and operation
- information available from and controls exercised by/through the SCADA system
- facilities and information offered by SCADA
- support/training/skill development mechanisms available for access by team member.

## 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, the Range Statement and the Assessment Guidelines for this Training Package.

<b>Overview of assessment requirements</b>	The person will not only be a competent user of SCADA but will also support their team using it.
<b>What critical aspects of evidence are required to demonstrate competency in this unit?</b>	Evidence of competent use of SCADA and also of assisting the team to use it effectively and efficiently.
<b>In what context should assessment occur?</b>	Assessment will need to occur on an organisation using SCADA or by use of SCADA simulation.
<b>Are there any other units which could or should be assessed with this unit or which relate directly to this unit?</b>	<p>This unit may be assessed concurrently with other relevant units.</p> <p>This unit covers the intermediate skill level of SCADA. <i>MSACMT261A Use SCADA systems in manufacturing</i>, and <i>MSACMT660A Develop the application of enterprise systems in manufacturing</i> cover the lower and higher skill levels in CM respectively.</p> <p><i>MSACMT261A Use SCADA systems in manufacturing</i> is specified as a prerequisite, and should be applied to the person's own job.</p>
<b>What method of assessment should apply?</b>	<p>Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment.</p> <p>Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit.</p> <p>The assessee will have access to all techniques, procedures, information, resources and aids which</p>



<b>EVIDENCE GUIDE</b>	
	would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
<b>What evidence is required for demonstration of consistent performance?</b>	Evidence of routine use over an extended period should be available. SCADA systems will typically log all interactions with it. Interrogation of the SCADA system will therefore provide evidence of the operator's use of it. Actions taken may also be accessible from the SCADA system itself, or may need other evidence available from the process.
<b>What are the specific resource requirements for this unit?</b>	Access to an organisation using SCADA.

## Range Statement

### 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.

#### SCADA

System Control and Data Acquisition (SCADA) is a general term applied to a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information personnel for action.

In the continuous manufacturing sector, the SCADA system is sometimes integrated into other sophisticated computer control systems such as Distributed Control System (DCS) and indeed these systems do merge in advanced systems. These organisations may simply refer to their SCADA as the DCS or other similar term (such as the proprietary name of the computer system).

#### Value chain

Competitive manufacturing organisations encompass the entire production system, beginning with the customer, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the value chain (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.

## Unit Sector(s)

<b>Unit Sector</b>	CM Tools
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**corequisite units**

<b>Corequisite units</b>	
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**Functional area**

<b>Functional Area</b>	
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## PSPPROC414A Manage contracts

### Modification History

Not applicable.

### Unit Descriptor

<p><b>Unit descriptor</b></p>	<p>This unit covers the ability to manage contracts. It includes undertaking preparations, establishing and maintaining contract management arrangements, monitoring and maintaining contract performance, and completing and reviewing contracts.</p> <p>In practice, managing contracts overlaps with other generalist and specialist public sector work activities, such as upholding and supporting the values and principles of public service and local government, identifying and treating risks, exercising delegations, applying government processes, encouraging compliance with legislation in the public sector or local government, planning procurement, developing and distributing requests for offers and selecting providers.</p> <p>Those who specialise in procurement are catered for by the units PSPPROC503B, PSPPROC504B, PSPPROC505A and PSPPROC506A, which address in depth the aspects of contract management performed by those who specialise in procurement.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<p><b>Application of the unit</b></p>	<p>This unit applies to those who are not specialist contract managers, but manage contracts as part of their role rather than as their primary role.</p>
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## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## 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. <b>Prepare to manage a contract.</b></p>	<p>1.1. <i>Contract</i> requirements, approvals and funding arrangements are confirmed and clarified where necessary, and obligations and limits of authority as contract manager are identified in line with contractual and organisational requirements.</p> <p>1.2. Operational elements of the contract are confirmed and contact is made with <i>specialists</i> and <i>stakeholders</i> to clarify and assist with contract administration issues.</p> <p>1.3. <i>Key contract clauses</i> are identified and their content is clarified as necessary to ensure contract requirements are understood.</p> <p>1.4. Process, timings, and key performance indicators are identified from the contract and confirmed with stakeholders.</p> <p>1.5. <i>Risks</i> are confirmed and a risk management plan is developed or reviewed in line with contract requirements and organisational policy and procedures.</p> <p>1.6. <i>Contract management strategy</i> is developed or <i>obtained</i> and key details are entered from the contract.</p> <p>1.7. Contract management team is formed and roles and responsibilities are allocated.</p>
<p>2. <b>Implement a contract management strategy.</b></p>	<p>2.1. Start-up or transition arrangements are confirmed and implemented according to contract requirements and organisational procedures.</p> <p>2.2. Information and <i>communication strategies</i> are established to meet contractor, stakeholder and organisational needs.</p> <p>2.3. Risk management plan is monitored for effectiveness and adapted as necessary during the life of the contract.</p> <p>2.4. Relationship with contractors and stakeholders is established and managed according to organisational policy and procedures and probity requirements.</p> <p>2.5. Specialist expertise is obtained as necessary for progress meetings and for advice on or resolution of contract issues.</p> <p>2.6. Consideration is given to OHS, environmental and sustainability principles and corporate social</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>responsibility principles as they apply to the contract.</p> <p>2.7. Contract information/documentation is maintained for organisational purposes according to organisational policy and procedures.</p>
<p>3. <b>Monitor and maintain performance of a contract.</b></p>	<p>3.1. Obligations to contractor and stakeholders are met according to contractual arrangements and organisational financial management requirements.</p> <p>3.2. <b>Monitoring and control measures</b> and performance indicators are used to manage performance of contract and ensure that all obligations under the agreement are being met.</p> <p>3.3. <b>Contract variations</b> are managed in accordance with the contract, organisational policy and procedures, and probity requirements.</p> <p>3.4. <b>Disputes</b> and complaints are investigated and <b>resolved</b> or referred according to contract requirements.</p> <p>3.5. <b>Negotiation</b> of issues relating to the contract is managed and approvals are obtained according to stipulations in the contract proper.</p> <p>3.6. Communication is maintained with all stakeholders on the performance of the contract according to organisational protocols and public sector standards.</p>
<p>4. <b>Complete and review contract.</b></p>	<p>4.1. Client satisfaction with contract deliverables is confirmed.</p> <p>4.2. Contracts are finalised, amended, cancelled or terminated according to contractual arrangements.</p> <p>4.3. Strategies are applied to manage close-out, and ensure renewal of contract or transition to a new contract meet organisational guidelines, probity requirements and public sector standards.</p> <p>4.4. <b>Review</b> is undertaken of contract management, contractor performance relevant to measures at each stage of the contract, user satisfaction and audit results, when necessary.</p> <p>4.5. Where measures or outcomes are not met in full, variances are documented and explained.</p> <p>4.6. Information from the review and audit is used to report on contractor performance, to review contract management practice and make recommendations for improvement.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- communication skills to:
  - consult and negotiate with contractors and stakeholders, involving complex oral and written exchanges of information
  - network, within probity boundaries, with diverse stakeholders and contractors
  - read complex documents, such as contracts, legislation and guidelines
  - provide feedback
- teamwork skills to:
  - work independently or under direction as appropriate to the situation
  - model team leadership approaches if appropriate
  - respond to diversity
  - refer issues to the correct person
- problem-solving skills to apply simple supply chain management and supplier issues management to the process of contract management
- initiative and enterprise skills to:
  - apply the content of complex documents, such as contracts, legislation and guidelines
  - apply OHS, environmental, sustainability and corporate social responsibility practices in the context of contract management
- planning and organising skills to manage contract documentation
- learning skills to keep up-to-date with relevant procurement legislation, policies and procedures
- technology skills to:
  - operate organisational IT systems
  - use electronic procurement templates

#### Required knowledge

- commonwealth, state or territory, and local government legislation, policies, practices and guidelines:
  - relating to contract management, including environmental purchasing and corporate social responsibility guidance
  - such as OHS and equity and diversity
- organisational procurement policies, practices and approval processes
- contract performance management
- privacy and confidentiality issues
- probity principles and issues



<b>REQUIRED SKILLS AND KNOWLEDGE</b>
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| <ul style="list-style-type: none"><li>• codes of conduct, codes of practice and standards of individual behaviour relating to managing contracts and relationships with contractors</li><li>• whole-of-life considerations relating to the ownership, operation and disposal/completion of the goods or services</li><li>• equal employment opportunity</li><li>• financial and accounting issues relevant to the contract</li></ul> |
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## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<b>Overview of assessment</b>	<p>Competency must be demonstrated in the ability to manage contracts consistently in accordance with legislative and organisational requirements.</p>
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Assessment must confirm the ability to:</p> <ul style="list-style-type: none"> <li>• develop a contract management strategy in consultation with key stakeholders</li> <li>• develop a suitable contract management plan, using templates if available</li> <li>• implement the contract management plan</li> <li>• manage the performance of contractors</li> <li>• provide contractors with performance feedback</li> <li>• manage contract disputes to achieve prompt resolution and refer to higher authority when necessary</li> <li>• review contracts throughout to identify opportunities for continuous improvement</li> <li>• act within own delegations and refer issues to higher authority when necessary</li> <li>• uphold probity standards in all dealings with contractors.</li> </ul> <p><b>Consistency in performance</b></p> <p>Competency should be demonstrated by providing evidence of undertaking a range of relevant work tasks in an actual or simulated procurement environment on at least two separate occasions.</p>
<b>Context of and specific resources for assessment</b>	<p>The unit of competency is to be assessed in the workplace or a simulated workplace environment.</p> <p>Access may be required to:</p> <ul style="list-style-type: none"> <li>• legislation, policy, procedures and protocols relating to procuring goods and services and managing contracts</li> <li>• codes of conduct and codes of practice</li> <li>• workplace scenarios and case studies relating to a range of procurement activities associated with managing contracts</li> <li>• case studies that incorporate dilemmas, and probity requirements relating to managing contracts.</li> </ul>
<b>Method of assessment</b>	<p>The following assessment methods are suggested:</p>

<b>EVIDENCE GUIDE</b>	
	<ul style="list-style-type: none"> <li>• questions to assess understanding of relevant legislation and procedures</li> <li>• review of strategies and approaches adopted for managing contracts</li> <li>• review of contract management plans, contracts, contract variations, contractor performance reports, contract closure documents and other documentation prepared by the candidate in a range of contexts</li> <li>• review of stakeholder engagement approaches adopted by the candidate.</li> </ul> <p>In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.</p>
<b>Guidance information for assessment</b>	<p>Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments.</p> <p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>• PSPETHC401A Uphold and support the values and principles of public service</li> <li>• PSPGOV417A Identify and treat risks</li> <li>• PSPGOV421A Exercise delegations</li> <li>• PSPLEGN401A Encourage compliance with legislation in the public sector</li> <li>• PSPPROC411A Plan procurement</li> <li>• PSPPROC412A Develop and distribute requests for offers</li> <li>• PSPPROC413A Select providers and develop contracts.</li> </ul>

## Range Statement

### 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.

***Contracts*** may include:

- memoranda of understanding and memoranda of agreement
- in-house option directives
- common use arrangements/standing offers
- inter and intra-government agreements
- letters of intent
- licensing agreements.

***Specialists*** may include:

- procurement and contracting
- corporate finance
- outsourced procurement or contracting advisers
- legal advisers
- functional/business
- technical
- business owner of the contract
- OHS
- environmental
- audit and probity
- appropriate cross-government department experts.

***Stakeholders*** may include:

- end users, customers or clients, and sponsors
- current or potential providers or suppliers
- technical or functional experts or advisers
- commonwealth, state or territory, and local government
- the organisation
- other public sector organisations
- employees, unions and staff associations
- industry bodies
- local communities
- lobby groups and special user groups.

***Key contract clauses*** may include:

- specifications
- variations
- insurances
- notices

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• disputes</li> <li>• intellectual property</li> <li>• privacy</li> <li>• confidentiality</li> <li>• milestones</li> <li>• payments</li> <li>• breaches</li> <li>• penalties</li> <li>• expected standards of behaviour.</li> </ul>
<b>Risks</b> may include:	<ul style="list-style-type: none"> <li>• contractor inability to meet agreements</li> <li>• end user or buyer inability to meet obligations</li> <li>• limited number of suppliers</li> <li>• corruption risks</li> <li>• probity risks.</li> </ul>
<b>Contract management strategy</b> may include:	<ul style="list-style-type: none"> <li>• formal contract management plan</li> <li>• contract management checklist</li> <li>• setting up routines</li> <li>• checking quality assurance systems</li> <li>• transferring legal responsibility</li> <li>• avoiding implied acceptance of varied conditions through non-enforcement of contractual obligations</li> <li>• applying environmental, sustainability and corporate responsibility principles.</li> </ul>
Contract management strategy may be <b>obtained</b> from:	<ul style="list-style-type: none"> <li>• procurement/contracting area</li> <li>• specialist contract managers</li> <li>• central agencies, such as state supply boards, and contract and management services</li> <li>• finance area</li> <li>• legal advisers</li> <li>• outsourced providers of contracting services.</li> </ul>
<b>Communication strategies</b> may include:	<ul style="list-style-type: none"> <li>• setting regular times to talk, meet or check on progress</li> <li>• protocols for dealing with other stakeholders</li> <li>• emergency contact arrangements</li> <li>• diary system to monitor milestones, timeframes, receipt of deliverables, etc.</li> <li>• strategies for ensuring information flow at critical stages of the contract.</li> </ul>
<b>Monitoring and control measures</b> may include:	<ul style="list-style-type: none"> <li>• inspections</li> <li>• tests</li> <li>• audits</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• reviews</li> <li>• meetings</li> <li>• progress reports</li> <li>• verifications</li> <li>• identification of non-conformances</li> <li>• corrective actions.</li> </ul>
<i>Contract variations</i> may include:	<ul style="list-style-type: none"> <li>• change of scope</li> <li>• change in prices</li> <li>• change in quantity</li> <li>• change to specifications</li> <li>• negotiation of new terms and conditions</li> <li>• dissolution of contracts</li> <li>• in writing</li> <li>• verbal variations, confirmed in writing</li> <li>• variations by action/inaction.</li> </ul>
<i>Disputes</i> may include:	<ul style="list-style-type: none"> <li>• disputes over: <ul style="list-style-type: none"> <li>• requirements</li> <li>• delivery schedules</li> <li>• price changes</li> <li>• additional tasking</li> <li>• payment schedules</li> </ul> </li> <li>• complaints from third parties.</li> </ul>
Techniques available to <i>resolve</i> disputes include:	<ul style="list-style-type: none"> <li>• conference</li> <li>• negotiation</li> <li>• mediation</li> <li>• expert determination</li> <li>• arbitration</li> <li>• resort to contractual conditions</li> <li>• legal considerations.</li> </ul>
<i>Negotiation</i> of issues may include:	<ul style="list-style-type: none"> <li>• contract variations</li> <li>• continuous improvement</li> <li>• innovations</li> <li>• non-compliance</li> <li>• consequences.</li> </ul>
<i>Review</i> may include:	<ul style="list-style-type: none"> <li>• planning process</li> <li>• evaluation considerations at each stage of the contract</li> <li>• sources and methods of gathering data</li> <li>• role of audit trails, where applicable</li> <li>• measuring outputs</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"><li>• meeting client needs</li><li>• considering new and different ways of delivering the service or product in the future</li><li>• strategies for continuous improvement.</li></ul>



**Unit Sector(s)**

Not applicable.

**Competency field**

<b>Competency field</b>	Procurement and Contract Management
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## PSPPROC506A Plan to manage a contract

### Modification History

Not applicable.

### Unit Descriptor

<p><b>Unit descriptor</b></p>	<p>This unit covers the ability to establish arrangements for contract management. It includes confirming contract requirements, preparing a contract management plan, and implementing contract strategies and contractual arrangements.</p> <p>In practice, planning to manage a contract may overlap with other public sector and local government generalist and specialist work activities, such as promoting the values and ethos of public service or local government, undertaking negotiations, promoting compliance with legislation in the public sector, managing contract performance, finalising contracts, managing procurement risk, planning for procurement outcomes and making procurement decisions.</p> <p>PSPPROC414A Manage contracts is the appropriate unit for people undertaking contract management as a minor part of their work role.</p> <p>No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.</p>
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### Application of the Unit

<p><b>Application of the unit</b></p>	<p>This unit applies to those whose primary role is contract management, and who may or may not have had involvement in the procurement process preceding execution of the contract.</p>
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### Licensing/Regulatory Information

Not applicable.



## Pre-Requisites

<b>Prerequisite units</b>	
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## 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. <b>Confirm contract requirements.</b></p>	<p>1.1. <i>Legislation, public sector standards and organisational requirements</i> relating to <i>probity</i>, financial management, approvals and <i>other considerations</i> are identified for inclusion in the <i>contract</i> management plan.</p> <p>1.2. <i>Contract requirements</i> are re-confirmed with all parties.</p> <p>1.3. Obligations to the contractor, limits of authority and <i>delegations</i> relating to contract are determined according to contractual arrangements and organisational policy and procedures.</p> <p>1.4. Start-up or transition arrangements are confirmed.</p>
<p>2. <b>Prepare contract management plan.</b></p>	<p>2.1. <i>Contract risks</i> are identified and risk management plan is developed in line with contract requirements and organisational policy and procedures.</p> <p>2.2. Procedures to identify, receive and address contract <i>variations</i> are determined according to contract requirements and organisational policy and procedures.</p> <p>2.3. <i>Procedures</i> to investigate, resolve or refer <i>disputes</i> or complaints are determined according to contract requirements and organisational policy and procedures.</p> <p>2.4. Key performance indicators are developed and negotiated, and <i>administrative processes</i> are identified and approved for the life of the contract according to organisational policy procedures.</p> <p>2.5. <i>Contract management plan</i> that addresses key elements is documented, approved and maintained according to organisational requirements.</p> <p>2.6. Expected standards of behaviour, probity and privacy principles are applied to all elements of contract management plan.</p> <p>2.7. Environmental, sustainability and corporate social responsibility principles are applied to all elements of contract management plan.</p>
<p>3. <b>Develop stakeholder relationships.</b></p>	<p>3.1. <i>Stakeholder</i> networks and relationships are identified.</p> <p>3.2. Networking strategies are used, within probity boundaries, to establish, develop and maintain working relationships to promote benefits to the</p>

ELEMENT	PERFORMANCE CRITERIA
	<p>contract requirements.</p> <p>3.3. Confidence of stakeholders is developed and maintained through high standards of behaviour and ethical conduct.</p> <p>3.4. Negotiation strategies are used to achieve positive outcomes when difficult situations arise.</p> <p>3.5. Communication requirements are identified and confirmed in line with contractual obligations and stakeholder needs.</p>
<p>4. <b>Implement contract strategies.</b></p>	<p>4.1. Requirements of confidentiality and freedom of information are identified for the contract.</p> <p>4.2. <i>Communication/information strategy</i> is developed that matches needs of the organisation, the contract and the contractor's business environment.</p> <p>4.3. Contract review requirements are established with stakeholders.</p> <p>4.4. <i>Contract review strategy</i> is developed to review management of the contract, contractor performance and user satisfaction.</p>
<p>5. <b>Implement contractual arrangements.</b></p>	<p>5.1. Business relationship with contractor is established and managed according to organisational policy and procedures and probity requirements.</p> <p>5.2. Start-up or transition arrangements are implemented.</p> <p>5.3. Financial, administrative and information management processes are established.</p> <p>5.4. Contractual arrangements are implemented according to contract management plan.</p> <p>5.5. Appropriate <i>contract records</i> are maintained for the life of the contract.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

- communication skills to:
  - consult and negotiate with contractors and stakeholders
  - network, within probity boundaries, with contractors and stakeholders
  - develop a written contract management plan and sub-plans
  - read complex documents, such as contracts, legislation and guidelines
  - provide feedback
- teamwork skills to:
  - model effective team management approaches
  - respond to diversity
  - refer issues to the correct person
- problem-solving skills to:
  - apply OHS requirements in the context of contract management
  - apply understanding of supplier issues and supply chain management in the context of procurement risk management
- initiative and enterprise skills to:
  - apply the content of complex documents, such as contracts, legislation and guidelines
  - apply OHS, environmental, sustainability and corporate social responsibility practices in the context of planning for contract management
- planning and organising skills to manage and update the contract management plan and sub-plans
- learning skills to keep up-to-date with:
  - best practice examples in procurement practice
  - relevant procurement legislation, policies and procedures
- technology skills to:
  - operate organisational IT systems
  - use electronic procurement templates

#### Required knowledge

- commonwealth, state or territory, and local government legislation, policies, practices and guidelines:
  - relating to contract management, including environmental purchasing, sustainability and corporate social responsibility guidance relevant to the contract
  - such as OHS and equity and diversity

## **REQUIRED SKILLS AND KNOWLEDGE**

- organisational procurement policies, practices and approval processes
- contract management planning for a range of contractual situations
- privacy and confidentiality issues
- probity principles and issues
- codes of conduct, codes of practice and standards of individual behaviour relating to management of contracts and relationships with contractors
- whole-of-life considerations
- financial and accounting issues relevant to the contract
- equal employment opportunity relevant to the contract
- OHS requirements relevant to the contract

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<p>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.</p>	
<p><b>Overview of assessment</b></p>	<p>Competency must be demonstrated in the ability to plan to manage a contract consistently in accordance with legislative and organisational requirements.</p>
<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>Assessment must confirm the ability to:</p> <ul style="list-style-type: none"> <li>• develop a contract management strategy in consultation with key stakeholders</li> <li>• develop a contract management plan suited to more complex contracts, using templates if available, which may include sub-plans such as risk, transition and probity</li> <li>• implement the contract management strategy and the contract management plan</li> <li>• develop and maintain a sound business relationship with internal and external stakeholders</li> <li>• manage the performance of contractors to ensure the effective delivery of value for money outcomes under the contract</li> <li>• manage more complex contract disputes to achieve prompt resolution and refer to higher authority when necessary</li> <li>• review contract throughout to identify opportunities for continuous improvement</li> <li>• act within own delegations and refer issues to higher authority when necessary.</li> </ul> <p><b>Consistency in performance</b></p> <p>Competency should be demonstrated by providing evidence of undertaking a range of relevant work tasks in an actual or simulated procurement environment on at least two separate occasions.</p>
<p><b>Context of and specific resources for assessment</b></p>	<p>The unit of competency is to be assessed in the workplace or a simulated workplace environment.</p> <p>Access may be required to:</p> <ul style="list-style-type: none"> <li>• legislation, policy, procedures and protocols relating to procuring goods and services and managing contracts</li> <li>• codes of conduct and codes of practice</li> <li>• workplace scenarios and case studies relating to a range of procurement activities associated with planning to manage a contract</li> <li>• case studies that incorporate dilemmas, and probity</li> </ul>

<b>EVIDENCE GUIDE</b>	
	requirements relating to planning to manage a contract.
<b>Method of assessment</b>	<p>The following assessment methods are suggested:</p> <ul style="list-style-type: none"> <li>• questions to assess understanding of relevant legislation and procedures</li> <li>• review of strategies and approaches adopted for planning to manage a contract</li> <li>• review of contract management plans, contracts, probity plans, budgets, transition plans, approvals and sign-offs, and other documentation prepared by the candidate in a range of contexts</li> <li>• review of stakeholder engagement approaches adopted by the candidate.</li> </ul> <p>In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Questioning techniques should suit the language and literacy levels of the candidate.</p>
<b>Guidance information for assessment</b>	<p>Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments.</p> <p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"> <li>• PSPETHC501B Promote the values and ethos of public service</li> <li>• PSPGOV507A Undertake negotiations</li> <li>• PSPLEGN501B Promote compliance with legislation in the public sector</li> <li>• PSPPROC503B Manage contract performance</li> <li>• PSPPROC504B Finalise contracts</li> <li>• PSPPROC505A Manage procurement risk</li> <li>• PSPPROC507A Plan for procurement outcomes</li> <li>• PSPPROC508A Make procurement decisions.</li> </ul>

## Range Statement

### 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.

<p><b><i>Legislation, public sector standards and organisational requirements</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• financial management legislation</li> <li>• government procurement, purchasing and contracting legislation, policy and guidelines</li> <li>• ethics standards</li> <li>• codes of conduct and codes of practice</li> <li>• environmental purchasing.</li> </ul>
<p><b><i>Probity</i></b> principles:</p>	<ul style="list-style-type: none"> <li>• may include:             <ul style="list-style-type: none"> <li>• accountability</li> <li>• transparency</li> <li>• confidentiality</li> <li>• managing conflict of interest</li> <li>• impartiality</li> </ul> </li> <li>• are maintained to:             <ul style="list-style-type: none"> <li>• ensure conformity to processes</li> <li>• facilitate accountability</li> <li>• ensure proponents are treated in a fair and equitable manner</li> <li>• encourage commercial completion</li> <li>• preserve public and private sector confidence in government processes.</li> </ul> </li> </ul>
<p><b><i>Other considerations</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• corporate governance</li> <li>• intellectual property</li> <li>• privacy</li> <li>• freedom of information requirements</li> <li>• public liability insurance considerations.</li> </ul>
<p><b><i>Contracts</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• formal written contracts</li> <li>• standing offers (panels)</li> <li>• multi-use lists and similar arrangements</li> <li>• inter and intra-government agreements</li> <li>• letters of intent</li> <li>• memoranda of understanding and memoranda of agreement</li> </ul>



<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• licensing agreements</li> <li>• in-house option directives.</li> </ul>
<i>Contract requirements</i> may include:	<ul style="list-style-type: none"> <li>• terms and conditions</li> <li>• specifications</li> <li>• risk</li> <li>• managing hospitality</li> <li>• clauses dealing with: <ul style="list-style-type: none"> <li>• variations</li> <li>• insurances</li> <li>• notices</li> <li>• disputes</li> <li>• intellectual property</li> <li>• privacy</li> <li>• confidentiality</li> <li>• milestones</li> <li>• payments</li> <li>• breaches.</li> </ul> </li> </ul>
<i>Delegations</i> may include:	<ul style="list-style-type: none"> <li>• financial delegations</li> <li>• procurement delegations</li> <li>• compliance with instructions or finance circulars</li> <li>• special consideration if they concern travel, computers or software, leasing arrangements or issuing indemnities, or other special categories of goods and services</li> <li>• other delegations, such as disposals and human resources</li> <li>• confirmation by chief financial officer</li> <li>• ministerial authorisation.</li> </ul>
<i>Contract risks</i> may include:	<ul style="list-style-type: none"> <li>• contextual/environmental factors</li> <li>• supplier inability to meet obligations</li> <li>• end user or buyer inability to meet obligations</li> <li>• unclear contract terms and conditions</li> <li>• contractual disputes</li> <li>• factors outside the control of either party, such as global health pandemic, failure of third-party businesses, and natural disasters</li> <li>• implications if dependence on one supplier, versus risks in lack of continuity and consistency of services provided.</li> </ul>
<i>Variation</i> to agreements may arise from:	<ul style="list-style-type: none"> <li>• change of scope</li> <li>• negotiation of new terms and conditions</li> <li>• dissolution of contracts.</li> </ul>

<b>RANGE STATEMENT</b>	
<b><i>Procedures</i></b> to resolve disputes may include:	<ul style="list-style-type: none"> <li>• conference</li> <li>• negotiation</li> <li>• mediation</li> <li>• arbitration</li> <li>• resort to contractual conditions</li> <li>• litigation.</li> </ul>
<b><i>Disputes</i></b> may include:	<ul style="list-style-type: none"> <li>• disputes over: <ul style="list-style-type: none"> <li>• requirements</li> <li>• delivery schedules</li> <li>• price changes</li> <li>• additional tasking</li> <li>• payment schedules</li> </ul> </li> <li>• complaints from third parties.</li> </ul>
<b><i>Administrative processes</i></b> may include:	<ul style="list-style-type: none"> <li>• file and records management</li> <li>• audit trail</li> <li>• methodology for recording meetings</li> <li>• notes and follow-ups of meetings and actions agreed</li> <li>• management reporting.</li> </ul>
<b><i>Contract management plan</i></b> may include:	<ul style="list-style-type: none"> <li>• risk management plan</li> <li>• contingency plan</li> <li>• communication and public relations plan</li> <li>• human resource management plan</li> <li>• disposal plan</li> <li>• contract review plan</li> <li>• setting up routines</li> <li>• quality assurance systems</li> <li>• arrangements for transfer of legal responsibility</li> <li>• insurances</li> <li>• strategies to avoid implied acceptance of varied conditions through non-enforcement of contractual obligations</li> <li>• environmental/green procurement, sustainability and corporate social responsibility principles.</li> </ul>
<b><i>Stakeholders</i></b> may include:	<ul style="list-style-type: none"> <li>• contractor</li> <li>• buying organisation</li> <li>• board of management</li> <li>• steering committee</li> <li>• advisory panel</li> <li>• staff</li> </ul>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• union</li> <li>• industry</li> <li>• client</li> <li>• end user</li> <li>• parliamentarian</li> <li>• the public.</li> </ul>
<i>Communication/information strategies</i> may include:	<ul style="list-style-type: none"> <li>• setting regular times to talk, meet or check on progress</li> <li>• protocols for dealing with other stakeholders</li> <li>• appeals mechanisms for resolving conflict between clients and service providers</li> <li>• clear communication</li> <li>• reliability</li> <li>• emergency contact arrangements</li> <li>• diary system to monitor milestones, timeframes, receipt of deliverables, etc.</li> <li>• strategies for ensuring information flow at critical stages of the contract.</li> </ul>
<i>Contract review strategy</i> may include:	<ul style="list-style-type: none"> <li>• planning process</li> <li>• evaluation considerations at each stage of the contract</li> <li>• sources and methods of gathering data</li> <li>• role of audit trails</li> <li>• measuring outputs</li> <li>• meeting client needs</li> <li>• innovation</li> <li>• strategies for continuous improvement.</li> </ul>
<i>Contract records</i> may include:	<ul style="list-style-type: none"> <li>• contract and variations</li> <li>• contract management plan</li> <li>• financial records, such as funding submissions, budgets, delegations, invoices and payments</li> <li>• contractor performance information</li> <li>• contract reports</li> <li>• information about disputes and other issues</li> <li>• complaints and compliments.</li> </ul>

## Unit Sector(s)

<b>Unit sector</b>	
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## Competency field

Competency field	Procurement and Contract Management
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## Co-requisite units

Co-requisite units	
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## **PSPSOHS501A Participate in the coordination and maintenance of a systematic approach to managing OHS**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit descriptor**

This unit covers the actions necessary to participate in the coordination and maintenance of the OHS program, taking account of the responsibilities for managing OHS.

It includes strategies, policies and procedures necessary to systematically manage OHS and its evaluation to ensure that the workplace is, as far as practicable, safe and without risks to the health of employees and others.

In practice, participation in the coordination and maintenance of a systematic approach to managing OHS may overlap with other generalist or specialist public sector work activities such as promoting ethical practice, using complex communication strategies, undertaking research and analysis, coordinating resource usage, promoting compliance with legislation, etc.

### **Application of the Unit**

#### **Application of the unit**

This unit applies to individuals with managerial responsibility for coordinating and maintaining an OHS program. It involves identifying the need for change, planning and implementing strategies, integrating OHS within other functional areas, and some evaluation of the OHS management function.

The unit may be undertaken in the context of an OHS management system (OHSMS) or other systematic approaches to managing OHS.

### **Licensing/Regulatory Information**

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

**Employability skills** This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements are the essential outcomes of the unit of competency. Performance criteria describe the required performance needed to demonstrate achievement of the element. Where *italicised* text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

### ELEMENT

### PERFORMANCE CRITERIA

- 1. Contribute to the strategic planning process**
  - 1.1 Steps are taken to ensure that managers at all levels are aware of their OHS responsibilities and the role of OHS in the overall management approach.
  - 1.2 OHS needs and priorities are determined in consultation with relevant managers and other workplace *stakeholders* and *key personnel*.
  - 1.3 Recommendations are made for inclusion of OHS performance (including *positive performance indicators*) in the organisation's business plan.
  
- 2. Participate in the development of an OHS plan**
  - 2.1 Potential *motivators* amongst stakeholders together with potential *barriers to the implementation of a systematic approach to managing OHS* are identified.
  - 2.2 An *OHS plan* is developed, in consultation with workplace stakeholders, based on agreed priorities and with measurable outcomes.
  - 2.3 *Resources* required for implementation of the OHS plan are identified.
  - 2.4 Action plans with relevant responsibilities and time lines are developed.
  - 2.5 Action plans are communicated to key personnel.
  
- 3. Support the implementation of the systematic approach to managing OHS**
  - 3.1 Knowledge of OHS management and OHS disciplines is applied, in consultation with stakeholders, *OHSspecialists* and *technical advisors*, to the development of *policies and procedures*.
  - 3.2 Support is provided to managers to meet OHS responsibilities and for the implementation of action plans.
  - 3.3 Strategies are developed to effectively integrate OHS within *other functional areas and management systems* that impact on the management of OHS.
  - 3.4 OHS training needs are identified and recommendations for delivery formulated.
  
- 4. Provide advice to key personnel and stakeholders**
  - 4.1 Objective advice is provided in an *ethical* and non-discriminating manner.
  - 4.2 Situations are identified where OHS specialists may be required.
  
- 5. Participate in monitoring OHS**
  - 5.1 Implications for the management of OHS and *proposed changes to the workplace* are identified in consultation with stakeholders.
  - 5.2 Implications for the management of OHS, *external changes* and changes to available information and data are identified in

## **ELEMENT**

## **PERFORMANCE CRITERIA**

- consultation with stakeholders.
- 5.3 *Sources of workplace information and data* are accessed as part of regular monitoring of OHS.
- 5.4 Achievement against action plans is monitored and plans updated as appropriate.
- 5.5 Action is taken to update systematic approaches to managing OHS, taking into account proposed changes.
- 6. Participate in reviewing the management of OHS**
- 6.1 The effectiveness of systematic approaches to managing OHS is reviewed regularly.
- 6.2 Frequency, method and scope of review is determined in consultation with stakeholders.
- 6.3 Stakeholders have input to the review.
- 6.4 Targets for improvement in the management of OHS are identified and recommendations made for improvement.
- 6.5 Improvement strategies arising from the review are communicated to appropriate levels of authority through planning, documentation and implementation.



## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the essential skills and knowledge and their level, required for this unit.

#### Required skills:

Look for evidence that confirms skills in:

- relating to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- communicating effectively with personnel at all levels of organisation and OHS specialists and, as required, emergency service personnel
- preparing more detailed reports for a range of target groups including OHS committee, OHS representatives, managers and supervisors
- applying continuous improvement and action planning processes
- contributing to the strategic OHS performance of the organisation
- employing project management skills to achieve change
- managing own tasks within time frame
- using consultation and negotiation skills, particularly in relation to developing plans and implementing and monitoring designated actions
- contributing to the assessment of the resources needed to systematically manage OHS and, where appropriate, access resources
- analysing relevant workplace information and data, and make observations including of workplace tasks and interactions between people, their activities, equipment, environment and systems
- carrying out simple arithmetical calculations (eg % change), and produce graphs of workplace information and data to identify trends and recognise limitations
- interpreting information and data to identify areas for improvement
- conducting effective formal and informal meetings
- using basic computer and information technology skills to access internal and external information and data on OHS.

#### Required knowledge:

Look for evidence that confirms knowledge and understanding of:

- roles and responsibilities under OHS legislation of employees, including supervisors and contractors
- legislative requirements for OHS information and data, and consultation
- roles and responsibilities in relation to communication and consultation for OHS committees, OHS representatives, line management, employees and inspectors
- requirements for recordkeeping that addresses OHS, privacy and other legislation
- state/territory/Commonwealth OHS legislation (Acts, regulations, codes of practice, associated standards and guidance material) including prescriptive and performance approaches and links to other relevant legislation such as industrial relations, equal employment opportunity, workers compensation, rehabilitation etc
- structure and forms of legislation including regulations, codes of practice, associated

## REQUIRED SKILLS AND KNOWLEDGE

- standards and guidance material
- difference between common law and statutory law
- concept of common law duty of care
- facilitation of the use of tools such as positive performance indicators (PPIs) in assessment of OHS performance
- nature of information and data that provides valid and reliable results on performance of OHS management processes (including positive indicators, such as number of safety audits conducted)
- requirements for reporting under OHS and other relevant legislation including notification and reporting of incidents
- hierarchy of control and considerations for choosing between different control measures, such as possible inadequacies of particular control measures
- principles and practices of systematic approaches to managing OHS
- other function areas that impact on the management of OHS
- auditing methods and techniques
- how the characteristics and composition of the workforce impact on risk and the systematic approach to managing OHS eg
  - labour market changes
  - structure and organisation of workforce eg part-time, casual and contract workers, shift rosters, geographical location
  - language, literacy and numeracy
  - communication skills
  - cultural background/workplace diversity
  - gender
  - workers with special needs
- basic knowledge of organisational behaviour and culture as it impacts on OHS and on change
- ethics related to professional practice
- professional liability in relation to providing advice
- knowledge of organisational OHS policies and procedures
- nature of workplace processes (including work flow, planning and control) and hazards relevant to the particular workplace
- key personnel, including identifying 'change agents', within workplace management structure
- formal and informal communication and consultation processes and key personnel related to communication
- language, literacy and cultural profile of the workgroup
- organisational culture as it impacts on the workgroup.

## Evidence Guide

### EVIDENCE GUIDE

The Evidence Guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the unit descriptor, performance criteria, The range statement and the Assessment Guidelines for the Public Sector Training Package.

#### Units to be assessed together

Co-assessed units that may be assessed with this unit to increase the efficiency and realism of the assessment process include:

- PSPETHC501B Promote the values and ethos of public service
- PSPGOV512A Use complex workplace communication strategies
- PSPLEGN501B Promote compliance with legislation in the public sector
- PSPSOHS502A Participate in the management of the OHS information and data systems
- PSPSOHS503A Assist in the design and development of OHS participative arrangements.

#### Overview of evidence requirements

In addition to integrated demonstration of the elements and their related performance criteria, look for evidence that confirms:

- knowledge requirements of this unit
- skill requirements of this unit
- application of employability skills as they relate to this unit.

The assessment environment should not disadvantage the candidate and where the person has a disability the principle of reasonable adjustment should be applied during assessment.

#### Resources required to carry out assessment

These resources include:

- legislation, policy, procedures and protocols relating to the coordination and maintenance of a systematic approach to managing OHS
- workplace documentation, case studies and workplace scenarios to capture the range of situations likely to be encountered when participating in the coordination and maintenance of a systematic approach to managing OHS.

Valid assessment of this unit requires:

#### Where and how to assess evidence

- a workplace environment or one that closely resembles normal work practice and replicates the range of conditions likely to be encountered when participating in the coordination and maintenance of a systematic approach to managing OHS, including coping with difficulties, irregularities and breakdowns in routine

## EVIDENCE GUIDE

- participation in the coordination and maintenance of a systematic approach to managing OHS in a range of three or more contexts or occasions, over time.

Assessment methods should reflect but not exceed workplace demands, such as literacy, and the needs of individuals who might be disadvantaged.

Assessment methods suitable for valid and reliable assessment of this unit must use authenticated evidence from the workplace and/or training courses and may include a combination of two or more of:

- workplace projects
- simulation or role plays
- case studies and scenarios
- observation
- portfolios.

The assessment environment should not disadvantage the candidate and where the person has a disability the principle of reasonable adjustment should be applied during assessment.

### **For consistency of assessment**

Evidence must be gathered over time in a range of contexts to ensure the person can achieve the unit outcome and apply the competency in different situations or environments.

## Range Statement

### RANGE STATEMENT

The range statement provides information about the context in which the unit of competency is carried out. The variables cater for differences between States and Territories and the Commonwealth, and between organisations and workplaces. They allow for different work requirements, work practices and knowledge. The range statement also provides a focus for assessment. It relates to the unit as a whole. Text in *italics* in the Performance criteria is explained here.

- Stakeholders may include***
- managers
  - supervisors
  - health and safety and other employee representatives
  - employees
  - OHS committees
- Key personnel may include***
- managers from other areas
  - people involved in OHS decision making or who are likely to be impacted by decisions relating to OHS
- Positive performance indicators are***
- a means of focusing on assessing how successfully a workplace is performing through measuring OHS processes
- Motivators include***
- factors that make stakeholders likely to adopt OHS processes
- A systemic approach to managing OHS involves***
- comprehensive processes that are combined in a methodical and ordered manner to minimise the risk of injury or ill health in the workplace
  - processes of planning, allocation of resources, communication and consultation, hazard management, record keeping and reporting, training and competency, and review and evaluation for ongoing improvement
- Barriers to implementation of a systematic approach to managing OHS may include***
- barriers to communication, such as language/literacy
  - workplace culture issues, such as management commitment, supervisors' approach to compliance and acceptance of the priority of safety
  - diversity of workers
  - structural factors, such as multiple locations, shift work and supervisory arrangements
- OHS plan is***
- is a document that is usually developed annually but may be developed for a shorter or longer period and reviewed regularly, and
  - has OHS performance indicators (ie objectives and targets that are achievable and practical) reflecting systematic approaches to managing OHS
- Resources may include***
- financial requirement for implementation
  - personnel, including time allocation

## RANGE STATEMENT

- equipment
  - specialised resources
  - access to other resources such as:
    - OHS publications
    - OHS internal sites
    - industry-specific information
- OHS specialists may be internal or external and include*
- ergonomists
  - occupational hygienists
  - occupational health professionals
  - injury management advisors
- Technical advisors may include*
- engineers (such as design, acoustic, safety, mechanical and civil)
  - legal practitioners
  - workplace assessors and trainers
  - maintenance and trades persons
- Policies and procedures may include*
- is a document that is usually developed annually but may be developed for a shorter or longer period and reviewed regularly, and
  - has OHS performance indicators (ie objectives and targets that are achievable and practical) reflecting systematic approaches to managing OHS
- Other functional areas and management systems may include*
- strategic planning
  - purchasing, procurement and contracting
  - logistics
  - human resource, industrial relations and personnel management including payroll
  - engineering and maintenance
  - information, data and records management
  - finance and auditing
  - environmental management
  - quality management
- Ethical advice means that*
- the OHS practitioner provides objective advice with the prime aim of reduction of workplace injury and ill health
- Proposed changes to the workplace may include*
- design of workplace
  - design or purchase of new plant or equipment
  - materials purchases
  - changes to work processes, work systems, work organisation, work practices and conditions
  - changes to management practices
- External changes may*
- changes to legislation
  - new information and data available on OHS

## **RANGE STATEMENT**

*include*

***Sources of workplace  
information and data  
may include***

- hazard, incident and investigation reports
- workplace inspections
- minutes of meetings
- reports - including those of external consultants
- audits
- questionnaire information and data
- material safety data sheets (MSDSs) and registers

## **Unit Sector(s)**

Not applicable.

## **Competency field**

**Competency field** Specialist Occupational Health&Safety

## RIICCM205A Carry out manual excavation

### Modification History

Not applicable.

### Unit Descriptor

This unit covers the carrying out of manual excavation in the civil construction industry. It includes preparing for work, digging small excavation by hand, completing and isolating the excavation, and cleaning up. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

### Application of the Unit

This unit is appropriate for those working in an operational role at worksites within:

- Civil construction

### Licensing/Regulatory Information

Refer to Unit Descriptor.

### Pre-Requisites

Not applicable.

### Employability Skills Information

This unit contains employability skills.

### Elements and Performance Criteria Pre-Content

<p>Elements describe the essential outcomes of a unit of competency.</p>	<p>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.</p>
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for work	1.1. Access, interpret and apply <b>compliance documentation</b> relevant to the work activity 1.2. Obtain and confirm <b>safety requirements</b> from the <b>site</b> safety plan and organisational policies and procedures, and apply to the allotted task 1.3. Identify, obtain and implement <b>signage</b> requirements from the project <b>traffic</b> management plan 1.4. Select plant, <b>tools and equipment</b> to carry out tasks consistent with the requirements of the job, check for serviceability and rectify or report any faults 1.5. Identify <b>environmental protection requirements</b> from the project environmental management plan, and confirm and apply to the allotted task
2. Dig small excavations by hand	2.1. Confirm the location and specifications of the intended excavation on the ground before commencing work 2.2. Identify service markers or taped areas 2.3. Determine or confirm location of <b>underground services</b> to avoid damage or interference 2.4. Use hand tools correctly to dig post holes, small pits and trenches safely and to the required dimensions 2.5. Undertake trench collapse prevention procedures, where excavation is in unstable ground 2.6. Place barricades around the <b>excavation</b>
3. Complete and isolate the excavation	3.1. Clean loose material out of excavation using hand tools 3.2. Check excavation for confirmation with the specification or work instruction
4. Clean up	4.1. Clear loose material away from the edge of excavation 4.2. Clear work area and dispose of or recycle materials in accordance with project environmental management plan

	4.3.Clean, check, maintain and store tools and equipment
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## Required Skills and Knowledge

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

### Required skills

Specific skills are required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following, as required to carry out manual excavation:

- apply legislative, organisation and site requirements and procedures for carrying out manual excavation
- organise work activities
- select and use relevant tools and equipment safely
- identify and report on hazards related to the worksite and work activity
- communicate effectively to receive and clarify work instructions

### Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following, as required to carry out manual excavation:

- types, uses, limitations and maintenance requirements of manual excavation tools
- basic principles of soil technology for civil works
- basic trench collapse prevention techniques including benching and battering
- site safety requirements
- site isolation and traffic control responsibilities and authorities
- project quality requirements
- civil construction terminology
- concreting tools, plant and equipment
- JSAs/safe work method statement

## 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 worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following:

- knowledge of the requirements, procedures and instructions for carrying out manual excavation
- implementation of requirements, procedures and techniques for the safe, effective and efficient completion of manual excavation
- working with others to undertake and complete the manual excavation in a way that meets all of the required outcomes
- consistent timely completion of manual excavation that safely, effectively and efficiently meets the required outcomes

#### Context of and specific resources for assessment

- This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills.
- Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site circumstances.
- The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job.
- Customisation of assessment and delivery environment to sensitively accommodate

	<p>cultural diversity.</p> <ul style="list-style-type: none"> <li>• Aboriginal people and other people from a non English speaking background may have second language issues.</li> <li>• Where applicable, physical resources should include equipment modified for people with disabilities. Access must be provided to appropriate learning and/or assessment support when required.</li> </ul>
<b>Method of assessment</b>	<p>This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:</p> <ul style="list-style-type: none"> <li>• written and/or oral assessment of the candidate's required knowledge</li> <li>• observed, documented and/or first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> <li>• implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes</li> <li>• consistent achievement of required outcomes</li> </ul> </li> <li>• first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> <li>• working with others to undertake and complete the manual excavation</li> </ul> </li> </ul>
<b>Guidance information for assessment</b>	<p>Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.</p>

## 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.

<p><b>Relevant compliance documentation</b> may include:</p>	<ul style="list-style-type: none"> <li>• legislative, organisational and site requirements and procedures</li> <li>• manufacturer's guidelines and specifications</li> <li>• Australian standards</li> <li>• Employment and workplace relations legislation</li> <li>• Equal Employment Opportunity and Disability Discrimination legislation</li> </ul>
<p><b>Safety requirements</b> may include:</p>	<ul style="list-style-type: none"> <li>• OHS requirements in accordance with state or territory legislation and regulations, organisational safety policies and procedures, and project safety plan including: protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, use of First Aid equipment, hazard control and hazardous materials and substances</li> <li>• safe operating procedures including recognising and preventing hazards associated with high voltage power lines, uneven/unstable terrain, trees, overhead service lines, bridges, surrounding buildings, obstructions, structures, facilities, dangerous materials, recently filled trenches, other machines, personnel, traffic control, working at heights, working in proximity to others, worksite visitors and the public</li> <li>• safe parking practices including ensuring access ways are clear, equipment/machinery is away from overhangs and refuelling sites, safe distance from excavations, and secured from unauthorised access or movement</li> <li>• recognising hazards and risks including uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials</li> <li>• emergency procedures related to equipment</li> </ul>

	operation including emergency shutdown and stopping, extinguishing equipment fires, organisational First Aid requirements and evacuation
<b>Site conditions</b> may include:	<ul style="list-style-type: none"> <li>• dry</li> <li>• wet</li> <li>• mud</li> <li>• dust</li> <li>• varying day/night visibility</li> </ul>
<b>Signage</b> may include:	<ul style="list-style-type: none"> <li>• escort vehicle</li> <li>• highway traffic signs</li> <li>• site safety signage</li> <li>• temporary signage for the benefit of motorists and pedestrians</li> <li>• traffic conditions signage</li> </ul>
<b>Traffic conditions</b> may include:	<ul style="list-style-type: none"> <li>• congested urban environments</li> <li>• low traffic rural areas</li> <li>• off-road un-trafficked areas</li> <li>• buildings</li> <li>• parking sites</li> <li>• pedestrian areas</li> </ul>
<b>Tools and equipment</b> may include:	<ul style="list-style-type: none"> <li>• picks</li> <li>• crow-bars</li> <li>• shovels</li> <li>• hand augers</li> <li>• string lines</li> <li>• pegs</li> <li>• levels</li> <li>• tape measures</li> <li>• jack hammers</li> <li>• scabblers</li> </ul>
<b>Environmental protection requirements</b> may include:	<ul style="list-style-type: none"> <li>• organisational/project environmental management plan</li> <li>• waste management</li> <li>• water quality protection</li> <li>• noise</li> <li>• vibration</li> <li>• dust and clean-up management</li> </ul>
<b>Underground services</b> may include:	<ul style="list-style-type: none"> <li>• power</li> <li>• water</li> <li>• gas</li> <li>• telephone</li> </ul>

	<ul style="list-style-type: none"> <li>• sewerage</li> </ul>
<b>Excavations</b> may include:	<ul style="list-style-type: none"> <li>• trenches</li> <li>• post-holes</li> <li>• pits</li> <li>• levelling of the work area</li> </ul>
<b>Materials</b> may include:	<ul style="list-style-type: none"> <li>• clays</li> <li>• silts</li> <li>• stone</li> <li>• gravel</li> <li>• mu</li> <li>• rock <ul style="list-style-type: none"> <li>• metamorphic</li> <li>• igneous</li> <li>• sedimentary</li> </ul> </li> <li>• sand</li> <li>• topsoil</li> </ul>

## Unit Sector(s)

Civil Works (Common Units)

## Competency field

Refer to Unit Sector(s).

## Co-requisite units

Not applicable.

## RIICCM210A Install trench support

### Modification History

Not applicable.

### Unit Descriptor

This unit covers the installation of trench support in the civil construction industry. It includes planning and preparing, installing trench shoring, removing trench shoring, and cleaning up. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

### Application of the Unit

This unit is appropriate for those working in an operational role at worksites within:

- Civil construction

### Licensing/Regulatory Information

Refer to Unit Descriptor.

### Pre-Requisites

Not applicable.

### Employability Skills Information

This unit contains employability skills.

### Elements and Performance Criteria Pre-Content

<p>Elements describe the essential outcomes of a unit of competency.</p>	<p>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.</p>
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare	1.1. Access, interpret and apply <b><i>compliance documentation</i></b> relevant to the work activity 1.2. Obtain and confirm <b><i>safety requirements</i></b> from the site safety plan and organisational policies and procedures, and apply to the allotted task 1.3. Identify, obtain and implement <b><i>traffic control signage</i></b> requirements from the project traffic management plan 1.4. Select plant, <b><i>tools and equipment</i></b> to carry out tasks consistent with the requirements of the job, check for serviceability and rectify or report any faults 1.5. Identify <b><i>environmental protection requirements</i></b> from the project environmental management plan, and confirm and apply to the allotted task
2. Install trench shoring	2.1. Communicate with plant operator to ensure the <b><i>excavation of trenches</i></b> complies with site plan, line and depth 2.2. Determine and prepare <b><i>shoring method</i></b> 2.3. Set out positioning of shoring 2.4. Position or <b><i>erect shoring</i></b> within the trench 2.5. Secure shoring in position and check to ensure structural conformity with regulations 2.6. Clean out excavation out by hand to job requirements 2.7. Provide ladders for access and egress to site safety plan requirements
3. Remove trench shoring	3.1. Release jacking mechanisms and remove ladders 3.2. Check shoring and prepare it for lifting from the trench 3.3. Remove shoring from trench and store it on site
4. Clean up	4.1. Clear work area and dispose of or recycle materials in accordance with project environmental management plan 4.2. Clean, check, maintain and store tools and

	equipment
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## Required Skills and Knowledge

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

### Required skills

Specific skills are required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following, as required to install trench shoring:

- apply legislative, organisation and site requirements and procedures for installing trench shoring
- organise work activities
- select and use relevant tools and equipment safely
- identify and report on hazards related to the worksite and work activity
- communicate effectively to receive and clarify work instructions

### Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following, as required to install trench support:

- site and equipment safety requirements
- excavation techniques
- shoring methods and systems
- working in confined spaces
- construction techniques
- equipment types, characteristics, technical capabilities and limitations
- operational, maintenance and basic diagnostic procedures
- site isolation and traffic control responsibilities and authorities
- materials safety data sheets and materials handling methods
- project quality requirements
- civil construction terminology
- JSAs/safe work method statement

## 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 worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following:

- knowledge of the requirements, procedures and instructions for installing trench support
- implementation of requirements, procedures and techniques for the safe, effective and efficient completion of trench support installation
- working with others to undertake and complete the installation of trench support in a way that meets all of the required outcomes
- consistent timely completion of trench support installation that safely, effectively and efficiently meets the required outcomes
- installation of trench support on two projects in trenches deeper than 1.5 metres requiring the trench support to be installed, moved along or within the trench and removed from the trench

#### Context of and specific resources for assessment

- This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills.
- Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site circumstances.
- The assessment environment should not disadvantage the participant. For example,

	<p>language, literacy and numeracy demands of assessment should not be greater than those required on the job.</p> <ul style="list-style-type: none"> <li>• Customisation of assessment and delivery environment to sensitively accommodate cultural diversity.</li> <li>• Aboriginal people and other people from a non English speaking background may have second language issues.</li> <li>• Where applicable, physical resources should include equipment modified for people with disabilities. Access must be provided to appropriate learning and/or assessment support when required.</li> </ul>
<b>Method of assessment</b>	<p>This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:</p> <ul style="list-style-type: none"> <li>• written and/or oral assessment of the candidate's required knowledge</li> <li>• observed, documented and/or first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> <li>• implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes</li> <li>• consistent achievement of required outcomes</li> </ul> </li> <li>• first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> <li>• working with others to undertake and complete the trench support installation</li> </ul> </li> </ul>
<b>Guidance information for assessment</b>	<p>Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.</p>

## 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.

<p><b>Relevant compliance documentation</b> may include:</p>	<ul style="list-style-type: none"> <li>• legislative, organisational and site requirements and procedures</li> <li>• manufacturer's guidelines and specifications</li> <li>• Australian standards</li> <li>• Employment and workplace relations legislation</li> <li>• Equal Employment Opportunity and Disability Discrimination legislation</li> </ul>
<p><b>Safety requirements</b> may include:</p>	<ul style="list-style-type: none"> <li>• OHS requirements in accordance with state or territory legislation and regulations, organisational safety policies and procedures, and project safety plan including: protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, use of First Aid equipment, hazard control and hazardous materials and substances</li> <li>• safe operating procedures including recognising and preventing hazards associated with high voltage power lines, uneven/unstable terrain, trees, overhead service lines, bridges, surrounding buildings, obstructions, structures, facilities, dangerous materials, recently filled trenches, other machines, personnel, traffic control, working at heights, working in proximity to others, worksite visitors and the public</li> <li>• safe parking practices including ensuring access ways are clear, equipment/machinery is away from overhangs and refuelling sites, safe distance from excavations, and secured from unauthorised access or movement</li> <li>• recognising hazards and risks including uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials</li> <li>• emergency procedures related to equipment</li> </ul>

	operation including emergency shutdown and stopping, extinguishing equipment fires, organisational First Aid requirements and evacuation
<b>Traffic control signage</b> may include:	<ul style="list-style-type: none"> <li>• site safety signage</li> <li>• temporary signage for the benefit of motorists and pedestrians</li> <li>• barricades</li> <li>• traffic conditions signage</li> </ul>
<b>Tools and equipment</b> may include:	<ul style="list-style-type: none"> <li>• shoring systems</li> <li>• levelling equipment</li> <li>• hand and power tools</li> <li>• measuring equipment</li> <li>• shovels</li> <li>• picks</li> <li>• scaffolding</li> <li>• elevated work platforms</li> <li>• slings</li> <li>• chains</li> </ul>
<b>Environmental protection requirements</b> may include:	<ul style="list-style-type: none"> <li>• organisational/project environmental management plan</li> <li>• waste management</li> <li>• water quality protection</li> <li>• noise</li> <li>• vibration</li> <li>• dust</li> <li>• clean-up management</li> </ul>
<b>Excavations</b> may include:	<ul style="list-style-type: none"> <li>• trenches</li> <li>• wells</li> <li>• pits</li> </ul>
<b>Trench</b> may include:	<ul style="list-style-type: none"> <li>• trenches of at least 1.5 metres in depth</li> <li>• trenches less than 1.5 metres deep</li> </ul>
<b>Shoring method</b> may include:	<ul style="list-style-type: none"> <li>• fixed and/or adjustable trench boxes</li> <li>• drag boxes</li> <li>• hydraulic vertical shoring</li> <li>• close timber shoring</li> <li>• aluminium shoring shields</li> <li>• powerbrace</li> <li>• lite box aluminium panels</li> <li>• slide rails</li> </ul>
<b>Erect shoring</b> may include:	<ul style="list-style-type: none"> <li>• using trench shoring mechanisms including:</li> </ul>

	<ul style="list-style-type: none"><li>• closed timber sheeting</li><li>• soldier sets</li><li>• segmental sections</li><li>• trench shields</li><li>• using shoring securing mechanisms including:<ul style="list-style-type: none"><li>• footings</li><li>• needles</li><li>• anchors</li><li>• sole plates</li><li>• struts</li><li>• brackets</li></ul></li></ul>
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## Unit Sector(s)

Civil Works (Common Units)

## Competency field

Refer to Unit Sector(s).

## Co-requisite units

Not applicable.

## **RTD3507A Undertake sampling and testing of water**

### **Modification History**

Not applicable.

### **Unit Descriptor**

This competency standard covers the process of sampling and testing water quality as part of a monitoring program. It requires the ability to plan for sampling and testing, prepare equipment and resources, carry out sampling and testing and complete water sampling and testing activities. Sampling and testing water quality requires knowledge of monitoring schedules, hydrological cycle, water quality determinations and standards, principles of water quality control, sampling and testing methods and groundwater salinity.

### **Application of the Unit**

Not applicable.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

### **Employability Skills Information**

Not applicable.

### **Elements and Performance Criteria Pre-Content**

Not applicable.



## Elements and Performance Criteria

### Elements and Performance Criteria

Element	Performance Criteria
1 Plan for sampling and testing field work	1.1 Monitoring schedule is read/heard and confirmed with manager.
	1.2 <b>Advanced water quality and environmental parameters</b> are identified.
	1.3 Samples to be collected to determine water quality and environmental parameters are identified by supervisory staff.
	1.4 <b>Equipment</b> requirements for water sampling and testing are determined and arranged.
	1.5 Range of likely operating conditions, hazards and difficult/sensitive environments are assessed for impact on sampling and testing.
2 Prepare equipment and resources	2.1 Equipment required for sampling and testing is sourced according to monitoring procedures.
	2.2 Equipment is checked for availability and serviceability in accordance with enterprise procedures.
	2.3 Testing and correlation is carried out to verify correct and accurate performance of equipment.
	2.4 <b>Repairs and maintenance</b> of field-based equipment and instruments are carried out in accordance with enterprise procedures and manufacturer's instructions.
	2.5 Data or record sheets/books are collected for use.
	2.6 Equipment, data sheets and personnel are moved to sampling sites without injury or damage and readied for use.
	2.7 Equipment is installed and protected according to manufacturer's specifications, safety and enterprise requirements.
	2.8 Staff undertaking sampling and testing are briefed on and are aware of responsibilities in accordance

- with monitoring schedule.
- 2.9 Testing equipment is confirmed and serviceable for monitoring procedures in field conditions to enterprise and manufacturers' requirements.
- 3 Carry out sampling and testing of water
- 3.1 Tests are undertaken in accordance with monitoring plan and enterprise procedures to avoid **erroneous readings**.
- 3.2 **Samples** are taken and tested in accordance with monitoring standards and guidelines.
- 3.3 **Samples for external analysis** are prepared, packaged and sent to laboratory in accordance with monitoring schedule and laboratory standards.
- 3.4 Specific and general observations including information on relevant ambient and **antecedent environmental conditions** are made in accordance with monitoring schedule.
- 3.5 Personnel undertaking sampling and testing tasks are supervised and feedback given on work performance.
- 3.6 Equipment operation and work practices conform to **OHS requirements**.
- 4 Complete water sampling and testing activities
- 4.1 Equipment and clothing is cleaned, sanitised, repaired and stored in accordance with enterprise procedures.
- 4.2 Damaged or malfunctioning equipment is repaired on site or sent to manufacturer or specialist.
- 4.3 Test results and observations are accurately recorded on data sheets and forwarded in accordance with enterprise procedures.
- 4.4 Changes in field conditions and equipment are conveyed to supervisor according to enterprise procedures.

## Required Skills and Knowledge

Not applicable.

## Evidence Guide

### **What evidence is required to demonstrate competence for this standard as a whole?**

Competence in sampling and testing water quality requires evidence that water quality has been appropriately sampled and tested for a given site according to prescribed scientific procedures, standards and principles, monitoring schedules and industry best practice. The skills and knowledge required to sample and test for water quality must be **transferable** to a range of work environments and contexts. For example, this could include different locations, environments and monitoring schedules.

### **What specific knowledge is needed to achieve the performance criteria?**

Knowledge and understanding are essential to apply this standard in the workplace, to transfer the skills to other contexts and to deal with unplanned events. The knowledge requirements for this unit are listed below:

Hydrological cycle.

Water monitoring schedules and guidelines.

Standards for water quality.

Sampling and testing methods.

Groundwater contamination evaluation.

Sources of groundwater contamination.

Groundwater salinity - mechanisms, occurrence and management.

Irrigation induced salinity, mechanisms and management.

**What specific skills are needed to achieve the performance criteria?**

To achieve the performance criteria, some complementary skills are required. These skills include the ability to:

Plan for sampling and testing.

Prepare equipment and resources.

Carry out sampling and testing.

Complete water sampling and testing activities.

Record and input data into various data entry systems.

### What processes should be applied to this competency standard?

There are a number of processes that are learnt throughout work and life, which are required in all jobs. They are fundamental processes and generally transferable to other work functions. Some of these are covered by the **key competencies**, although others may be added. The questions below highlight how these processes are applied in this competency standard. Following each question a number in brackets indicates the level to which the key competency needs to be demonstrated where 0 = not required, 1 = perform the process, 2 = perform and administer the process and 3 = perform, administer and design the process.

- |  |   |
|--|---|
| 1. How can <b>communication of ideas and information</b> (2) be applied?       | Recording and reporting on sampling and testing activities.   |
| 2. How can <b>information be collected, analysed and organised</b> (3)?        | Through completion of record sheets, taking of samples for external analysis and recording of observations. |
| 3. How are <b>activities planned and organised</b> (3)?                        | Using appropriate equipment and in accordance with enterprise guidelines.                                   |
| 4. How can <b>team work</b> (3) be applied?                                    | Co-operation in sampling and testing activities.  |
| 5. How can the use of <b>mathematical ideas and techniques</b> (2) be applied? | Through evaluation of sampling and testing results and reporting to supervisor.                             |
| 6. How can <b>problem-solving skills</b> (2) be applied?                       | Assessing threats and changes to area being monitored.  |
| 7. How can the <b>use of technology</b> (2) be applied?                        | Use of field equipment and machinery.   |

### Are there other competency standards that could be assessed with this one?

This competency standard could be assessed on its own or in combination with other competencies relevant to the job function.

For information about **assessing this competency standard for consistent performance and where and how it may be assessed**, refer to the Assessment Guidelines for this Training Package.

## Range Statement

### Range of Variables

The Range of Variables defines the different contexts, work environments and parameters governing the performance of this competency standard. The variables chosen in training and assessment will need to reflect local industry and regional contexts

<p>What <b>advance water quality parameters</b> may be relevant to this competency standard?</p>	<p>Dissolved or suspended solids, nitrogenous products (TKN, TAN, NO<sub>2</sub><sup>-</sup>, NO<sub>3</sub><sup>-</sup>), redox, ozone, soil pH, clay content of soil, contaminants (including pesticides, herbicides, heavy metals), biological oxygen demand, bacterial levels (<b>E. coli</b> and faecal coliforms), aquatic life, chlorophyll, phosphorus (total and orthophosphate), macro-invertebrates and macrophytes.</p>
<p>Which <b>environmental parameters</b> may be included?</p>	<p>Changes in native land-based and/or aquatic life around the site, sediment and debris levels, wastes and contaminants, toxic microalgae and presence of severe weather conditions.</p>
<p>What <b>water quality and environmental parameters</b> may be relevant to this standard?</p>	<p>Dissolved oxygen, hardness, ammonia, nitrite, nitrate, carbon dioxide, alkalinity, temperature, salinity, pH and turbidity.</p>
<p>What <b>equipment</b> may be included?</p>	<p>Electronic machines, probes, grabs, nets, dredges, plankton nets, water sample bottles, fox whistle, bailer, still and video cameras, specialised machinery, micropipettes, soil analysis kits, and refractometer.</p>
<p>What <b>repairs and maintenance</b> may apply to field-based equipment?</p>	<p>Adjustment of probes or other settings for calibration, correlation and replacement of electronic parts, covers, probes.</p>
<p>How can <b>erroneous readings</b> be avoided?</p>	<p>By following monitoring schedule and standards, through regular readings (e.g., at the same time each month), by taking readings before irrigation cycles commence, by bailing out before taking the reading (especially where salinity levels are being assessed).</p>
<p>What types of <b>samples</b> may be included?</p>	<p>Water, weather station/meteorological data, sediments or soils, pests, predators or fouling organisms and vegetation (land and aquatic).</p>

What **samples for external analysis** may be relevant? Contaminants (such as heavy metals, pesticides, herbicides and other chemicals), proximate analysis of culture or other organisms, trace elements, mineral content of waters/soils and pathology.

What is meant by **antecedent environmental conditions**? Previously relevant weather, rainfall, irrigation, tides or floods that could influence sample/test results.

Which **OHS requirements** may be included? Codes of Practice, regulations and/or guidance notes which may apply in a jurisdiction, and enterprise-specific OHS procedures, policies or standards

For more information on contexts, environment and variables for training and assessment, refer to the Sector Booklet.

## **Unit Sector(s)**

Not applicable.