



Australian Government

Department of Education, Employment and Workplace Relations

NWP601 Design a water reticulation scheme

Release: 1

NWP601 Design a water reticulation scheme

Modification History

NWP601 Release 1: Primary release.

Unit Descriptor

This unit of competency sets out the knowledge and skills required to apply principles of design and design audit and review for a water reticulation scheme using appropriate design standards.

Application of the Unit

This unit applies to para-professionals responsible for the design of water reticulation schemes such as town water supplies.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

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 range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

Elements	Performance criteria
1 Define design requirements	1.1 Identify interfaces between pipeline networks and bulk water supply, transfer mains and pumping stations from the concept proposal. 1.2 Identify constraints and design problems within the concept proposal. 1.3 Seek clarification of design requirements as needed. 1.4 Negotiate with stakeholders to resolve design problems. 1.5 Confirm compliance with design standards and specifications relevant to the water reticulation system. 1.6 Document detailed design requirements. 1.7 Identify and apply initial data to the design.
2 Prepare design	2.1 Design detailed layout of water mains using project design requirements and design standards and specifications. 2.2 Plan location and installation requirements of stop valves, hydrants, scours, and air valves. 2.3 Design pipeline alignment and connection details. 2.4 Prepare structural and hydraulic design of pipelines.
3 Review design	3.1 Ensure design objectives and specifications have been met. 3.2 Ensure compliance with environmental standards.
4 Prepare and maintain documentation	4.1 Prepare supporting documentation in accordance with legislative and organisation requirements. 4.2 Maintain engineering and project records in accordance with legislative or organisation requirements.

Required Skills and Knowledge

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

Required skills:

- determine OHS, regulatory and risk management requirements
- interpret and apply legislative requirements
- assess environmental impacts
- apply quality requirements
- analyse complex information
- operate computer software
- conduct data modelling
- conduct investigations
- prepare documentation
- collaborate with a diverse team of specialists
- conduct consultations with a range of industry and community interests
- project planning

Required knowledge:

- application of civil engineering principles, mathematics, computer software and file handling
- legislative requirements for the design of water reticulation systems including environmental protection and occupational health and safety
- water network systems
- output quality
- specification requirements
- cost benefit analysis procedures
- risk analysis procedures
- computer software for planning, modelling and system analysis
- data modelling procedures
- investigation procedures and methodologies
- documentation and information management requirements
- OH&S and environmental legislation, acts and procedures

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
- 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

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

The candidate should demonstrate the ability to plan water reticulation systems including:

- identifying, analysing and defining water reticulation system design requirements, conditions and constraints
- identifying and interpreting legislative, environmental, business and project management requirements
- analysing a range of factors to determine hydraulic and system design components
- evaluating and clarifying system plans and options for system design
- managing and securing documentation to support and report project management
- evaluating design process and outcomes
- managing recording, reporting and information management

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 assessment support when required.

Method of assessment

The following methods are suggested:

- assessment in the workplace or in a simulated workplace and under the normal range of workplace conditions

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
- 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
- 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

Guidance information for assessment

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 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

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
- 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
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

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.

Water reticulation systems may include:

- urban potable water supply
- regional source management and water transfer
- reclaimed and wastewater supply for non potable use
- collection and distribution of treated wastewater into potable and non-potable water supply

Initial data may include:

- costs
- existing and future flows
- input and output quality
- customer requirements
- locations
- catchments
- demographics
- land use
- pressure
- hydrological information
- meteorological information
- topographic information

Detailed layout of water mains may include:

- water mains in road reserves
- water mains in easements
- effect on vegetation
- water mains near trees
- contaminated sites
- crossings
- mechanical protection of water mains
- railway reserves
- crossings of creeks or drainage reserves
- overhead power lines and transmission towers
- water mains in conjunction with landscaping and/or other development
- curved water mains

Structural and hydraulic design must include:

- pipe sizes
- hydraulic design pressures
- anchorage requirements for pipes and fittings
- minimum pipe classes and required pipes, fittings and appurtenances

- Project design requirements*** may include:
- reticulation main sizes and locations
 - pressure reducing valve locations and settings
 - staging of developments
 - preliminary reticulation main layouts
 - system configuration
 - service and operating pressures
 - pressure zone boundaries
 - water main sizes
 - water quality
 - pumping stations
 - storage tanks
 - future system expansion options

- Supporting documentation*** may include:
- records of:
 - construction
 - installation
 - commissioning
 - production
 - operation
 - maintenance
 - training
 - design proposals
 - design changes
 - quality assurance

- Legislative and organisation requirements*** may include:
- federal and state legislation
 - national guidelines
 - environmental protection agencies
 - water quality management strategy
 - relevant standards
 - industry codes of practice

Unit Sector(s)

Not applicable.

Competency field

Asset Creation.