Occupational Standards for Caribbean Vocational Qualifications (CVQ)

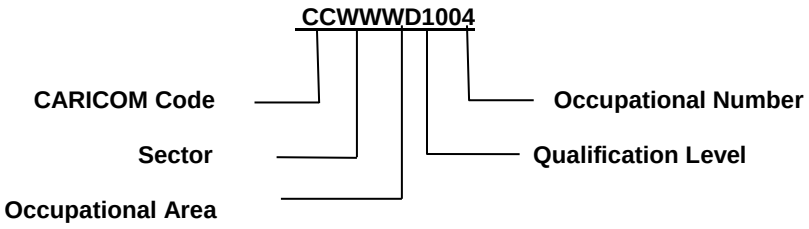
CCWWWD1004 CVQ Level 1 – Water Distribution System Operations

Unit Number	Unit Title	Requirement
WW00001	Maintain an efficient and effective work environment	Mandatory
WW00002	Maintain health, safety and environment in the workplace	Mandatory
WW00003	Prepare resources for site works	Mandatory
WW00008	Perform chemical dosing	Mandatory
WW00013	Lift and move loads	Mandatory
WW00022	Excavate holes and trenches in ground and pavement structures	Mandatory
WW00023	Prepare for the reinstatement of excavation and pavement surfaces	Mandatory
WW00025	Perform field support duties in the construction and maintenance of the water distribution system	Mandatory
WW00009	Work in confined spaces	Mandatory

To obtain a Caribbean Vocational Qualification (CVQ) all Mandatory Units must be achieved.

Legend to Occupational Standard code

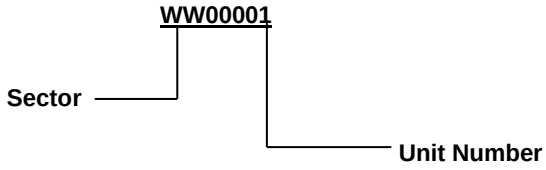
Example: CCWWWD1004



Key: CC – CARICOM; WW – Water and Wastewater; WD - Water Distribution System Operations; 1 - Level 1; 004 - Numerical sequence

Legend to Unit Code

Example: WW00001



Key: WW – Water and Wastewater; 00001 – unit #

Country of Origin: Trinidad and Tobago

Qualification Overview

Occupational Standards can also be used to:

- Prepare job descriptions and specifications
- Determine recruitment criteria
- Appraise staff performance objectively
- Identify skill and training gaps and needs
- Conduct labour market analyses
- Develop curriculum
- Assess the effectiveness of training programmes
- Determine compensation and rewards

The benefits of acquiring the CVQ to Candidates

- Provide a basis for articulation and accreditation
- Provides a broad-based preparation for employment
- Is an alternative route to further / higher education
- Complements and has parallel standing with academic qualifications
- Provides enhanced employability and higher earning potential
- Facilitates an apprenticeship with actual work experience
- Equips candidates with the knowledge, skills and attitudes for the workplace
- Past work experience and skills can count towards achieving the CVQ
- Allows for continuity whereby if a candidate cannot complete the CVQ at a centre or school, they can continue at another approved centre
- CVQ's are recognized qualifications and facilitates free movement of labour throughout CARICOM

The benefits of the CVQ to Employers

- Provides a larger cadre of skilled employees/candidates to choose from
- Reduces cost of recruiting and selecting the ideal job candidate
- Reduces cost for training workers
- Ensures higher levels of productivity

The benefits of the CVQ to the Caribbean region:

- Produces a higher skilled workforce that is ready to adapt to ever-changing global demands
- Provides greater access for persons to achieve higher qualifications
- Contributes to the region's human resource capacity development

WW00001 Maintain an Efficient and Effective Work Environment

Unit Descriptor:

This unit deals with the skills and knowledge required to effectively contribute to an efficient and effective work environment and applies to all individuals working in the Water and Wastewater Sector.

ELEMENTS		PERFORMANCE CRITERIA	
Candidates must be able to:			
1	Contribute to efficiency in the workplace	1.1	Organize work and operational area in an orderly way to minimize hazards
		1.2	Use and store work materials according to the work activity and company's approved procedures and practices
		1.3	Maintain and store tools and equipment in designated places when not required
		1.4	Communicate restrictions to progress of work to the company approved personnel for appropriate action
2	Develop and maintain effective working relationships	2.1	Carry out clear communications in accordance with operational and company procedures
		2.2	Carry out work according to company approved procedures and practices and in compliance with statutory requirements
		2.3	Treat work colleagues and associates in a manner that promotes goodwill and maintains good working practices
		2.4	Provide assistance to colleagues and associates experiencing work-related difficulties
		2.5	Communicate with colleagues and associates courteously, and according to the company's approved procedures and practices
		2.6	Refer problems and conditions outside personal responsibility to supervisor according to the company's approved procedures and practices
3	Organize work and maintain standards	3.1	Organize work in compliance with instructions and the agreed schedules
		3.2	Carry out the work methods in accordance with the company's approved procedures and practices to optimize

the use of time

3.3 Co-ordinate work with other relevant personnel and related activities according to supervisor's instructions, as required

3.4 Refer suggestions for improvements to work methods to company approved personnel for confirmation and agreement on the action to be taken

3.5 Carry out the work to the agreed standards and in accordance with the specification and the company policy

3.6 Confirm any deviations in standards or specifications with the supervisor

3.7 Refer work which may be detrimental to safety or the environment to the approved personnel in accordance with company and operational procedures

RANGE STATEMENT

All range statements must be assessed.

1. Problems include:

- spills
- accidents
- chlorine leaks
- flooding
- fire/smoke
- unusual sounds/odour
- leaks/drips

2. Hazards include:

- slippery surface (trips/falls)
- exposed wires (electric shock)
- sharp edged tools
- Chlorine gas (asphyxiation)
- toxic gas
- dangerous chemicals
- fires
- toxic and flammable gases and vapour
- explosions
- engulfment
- chemical spills
- high test hypochlorite (HTH)/activated carbon

3. Standards include:

- MSDS-Material Safety Data Sheet
- First aid
- SCBA-Self-contained breathing apparatus
- Occupational Safety and Health legislation
- International material safety database systems

UNDERPINNING KNOWLEDGE AND SKILLS

Candidates must know and understand:

1. what are the approved procedures for the work activity as directed by the supervisor
2. what are the personal protective equipment appropriate to the range of work operations
3. what are the approved procedures and practices for reporting
4. how to store tools and equipment, including storage arrangements; security arrangements and the importance of locking up stores
5. how to store and check out materials, including appropriate storage methods for the nature and characteristics of materials
6. how the range of materials may be affected by weather conditions
7. what are the different ways of communicating during work activities
8. what are the procedures for exchanging and recording information with and reporting problems to the supervisor
9. what are the range and roles of others involved in the work activities, including other trades, management representatives and external agencies
10. how to organise work according to supervisor's instructions
11. what condition should the finished work site be left in
12. what are the company and operational standards and legislation that apply to the work activity and environment (national water hygiene; road works acts; environmental and occupational safety and health legislation; regulatory bodies, water and wastewater legislation)

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

a. organise work in a manner that minimises hazards
b. store materials, tools and equipment according to company's approved procedures
c. carry out work according to company's approved procedures and standards
d. communicate with colleagues and associates courteously

(2) Method of Assessment

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.

(3) Context of Assessment

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

WW00002 Maintain Health, Safety and Environment in the Workplace

Unit Descriptor:

This unit deals with the skills and knowledge required to effectively perform work activities to conform to Occupational Safety and Health requirements, and applies to all individuals working in the Water and Wastewater Sector.

ELEMENTS	PERFORMANCE CRITERIA

Candidates must be able to:

1	Operate safely in the workplace	1.1	Perform work activities safely to avoid creating hazardous situations that may endanger workers and other personnel
		1.2	Identify and ensure that hazards and potential hazards in the workplace are dealt with in accordance with own level of responsibility
		1.3	Report actions to supervisor in accordance with company's approved procedures
		1.4	Provide clear **c**ommunications and confirm information or instructions with supervisor
		1.5	Use tools and equipment according to manufacturers' instructions and health and safety procedures
		1.6	Handle and store work materials and components according to company approved procedures
		1.7	Perform manual handling using appropriate techniques according to health and safety regulations
		1.8	Use personal protective equipment in compliance with safe working practices
		1.9	Perform work in accordance with company approved procedures and practices and in compliance with statutory requirements
2	Respond to emergencies	2.1	Respond to emergency situations within personal responsibility in accordance with company approved procedures
		2.2	Use emergency appliances in accordance with health and safety procedures

		2.3	Report details of accidents and incidents in accordance with company approved procedures
		2.4	Refer problems and conditions outside personal responsibility to company approved personnel
3	Maintain security of the workplace	3.1	Observe and maintain arrangements for security in accordance with company approved procedures
		3.2	Report potential risks to security to the supervisor and take remedial action in accordance with company procedures as necessary
		3.3	Report breaches of security in accordance with company approved procedures
4	Practice safe work habits	4.1	Maintain clean work spaces according to company approved procedures
		4.2	Adhere to and follow corporate drug and alcohol policies
		4.3	Maintain standards of personal hygiene in accordance with company policy
		4.4	Communicate potential safety hazards within personal responsibility to supervisor

RANGE STATEMENT

All range statements must be assessed.

1. Personal protective equipment includes:

- hearing protection
- eye protection
- respirators
- protective clothing
- safety vests
- safety footwear
- safety helmets
- safety belts
- gloves

2. Emergency situations include:

4. Hazards include:

- slippery surfaces (trips/falls)
- exposed wires (electric shock)
- sharp edged tools
- chlorine gas (asphyxiation)
- toxic gas
- dangerous chemicals
- fires
- toxic and flammable gases and vapour
- explosions
- engulfment
- chemical spills
- chemicals- sodium hypochlorite /High Test Hypochlorite (HTH)/activated carbon

5. Problems and conditions include:

- flooding

- spills-oil, fuel
- accidents/incidents
- gas leaks (chlorine)
- contamination
- chemical spills
- cave-ins (collapse)
- near drowning
- fire/smoke in panels
- unusual sounds/odour
- pest infestation

3. Health and safety procedures and legislation include:

- first aid
- Occupational Safety and Health legislation
- internal organisational regulations

6. Tools and equipment include:

- hand tools
- powered tools
- hoisting and rigging equipment
- fall protection equipment
- safety monitoring equipment
- SCBA-Self-contained breathing apparatus
- flotation devices

UNDERPINNING KNOWLEDGE AND SKILLS

Candidates must know and understand:

1. what are the hazards arising from the work activity
2. what are the procedures for reporting hazards
3. what are the tools and equipment including safety equipment required for work activities in hazardous areas
4. what are the types of materials used in the work operations, including disinfectants; chemicals etc
5. what are the training and certification requirements for operating plant and equipment
6. what are the recommended safety precautions and checks before, during and after work operations
7. what are the safe lifting and handling techniques for the range of tools, equipment and materials
8. what are the appropriate protective equipment for the range of work operations
9. how to identify hazardous materials, including toxic fumes and dust, and the appropriate action to take
10. what are the fire and emergency procedures, including those actions required to safeguard life and property
11. what are the different classifications of fires and the appropriate extinguishers used for dealing with them in the workplace
12. what are the procedures for reporting accidents and incidents
13. what are the types of personal accidents and health emergencies associated with the type of work to be carried out and the actions to take if they occur
14. what are the company policy and procedures with respect to security
15. what are the actions to take in cases of breaches of security, acts of vandalism and theft, and who to inform

16. what are the potential security risks to oneself, colleagues, personnel, materials, equipment and the environment, including risks of contamination
17. how to deal with unauthorised personnel and who should be informed
18. what are your responsibilities as it relates to job role
19. where the nearest health institution is located and how to contact them
20. how to keep safety training current to acceptable standards

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

a. use tools and equipment according manufacturer's instructions
b. use personal protective equipment in compliance with safe working practice
c. respond to emergency situations in accordance with approved company procedures
d. report details of accidents and incidents in accordance with approved company procedures
e. report breaches of security in accordance with approved company procedures

(2) Method of Assessment

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.

(3) Context of Assessment

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

WW00003 Prepare Resources for Site Works

Unit Descriptor:

This unit deals with the skills and knowledge required to assist with preparing resources for site works as well as preparing signs and guarding the area.

ELEMENTS	PERFORMANCE CRITERIA

Candidates must be able to:

1	Determine the site requirements for site works	1.1	Locate and confirm the area for site works according to supervisor's instructions and specified work requirements
		1.2	Set out the area for the site works in accordance with the specified work requirements
		1.3	Identify hazards and risks and take appropriate action to provide for the safety of the work area and the natural environment
2	Determine the resource requirements for site works	2.1	Identify resources needed for carrying out site works according to supervisor's instructions
		2.2	Report shortages and defects of materials, tools and equipment in accordance with operational and company procedures
		2.3	Confirm the supplies of materials, tools and equipment are correct for the work requirement, in line with supervisor's instructions and company requirements
		2.4	Perform work to company approved procedures and practices and in compliance with statutory requirements
		2.5	Maintain the security of materials and equipment in accordance with supervisor's instructions and company requirements
		2.6	Refer problems and conditions outside personal responsibility to supervisor in accordance with the company approved procedures and practices

RANGE STATEMENT

All range statements must be assessed.

1. Hazards include:

- slippery surface (trips/falls)
- exposed electrical wires (electric shock)
- sharp edged tools
- asphyxiation
- toxic gas
- dangerous chemicals
- fires
- toxic and flammable gases and vapour
- explosions
- engulfment

2. Tools and equipment include:

- signage
- barriers
- tape (e.g. caution tape)
- cones
- tripod
- harness
- equipment for hoisting, rigging
- equipment for fall protection (safety nets)
- safety monitoring equipment e.g. alarms, gas monitors
- personal protective equipment e.g. mask, safety shoes, respirators
- powered tools

UNDERPINNING KNOWLEDGE AND SKILLS

Candidates must be able to:

1. what is the importance of confirming that the work location is identified correctly from verbal instructions
2. what are the key requirements of an effective and safe work area
3. what are the different types of material, tools and equipment used
4. what are the essential maintenance requirements for tools and equipment
5. what are the common hazards in preparing resources and guarding the area
6. how to deal with emergencies
7. how to identify the safety equipment required for site operations
8. what are the personal protective equipment (PPE) that would be required for site operations
9. what are the lifting and handling techniques for the materials, tools and equipment
10. what are the approved procedures and practices for determining site and resource requirements
11. what are the procedures for recording and reporting to supervisors on work progress; problems and deviations to work programmes
12. why it is important to refer problems to supervisor
13. what are the health, safety and environmental responsibilities of the employer and employees engaged in site operations
14. what is the employee's responsibility for own safety and the safety of others
15. what are the legislative requirements and company procedures for recording and reporting accidents

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

a. confirm the area for site works with supervisor
b. identify and select the materials, tools and equipment required for site works
c. set out area for site works
d. maintain the security of materials and equipment

(2) Method of Assessment

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.

(3) Context of Assessment

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

WW00008 Perform Chemical Dosing

Unit Descriptor:

This unit deals with the skills and knowledge required to perform chemical dosing in the water and wastewater sector. It identifies the skills and knowledge required to prepare chemicals; dose chemicals in water and measure chemicals and residual chemicals.

ELEMENTS	PERFORMANCE CRITERIA

Candidates must be able to:

1	Adhere to health and safety procedures	1.1	Select and wear personal protective equipment according to occupational safety and health procedures
		1.2	Identify hazards associated with chemical dosing and inform supervisor following company approved procedures
2	Prepare and dose chemicals	2.1	Identify and use chemicals for water treatment processes in accordance with standard operating procedures
		2.2	Prepare batches of chemicals according to company approved procedures and supervisor's instructions
		2.3	Dose chemicals in water according to supervisor's instructions
		2.4	Measure chemical doses in accordance with company approved methods and procedures
		2.5	Make recommendations to supervisor for effective and efficient chemical treatment

RANGE STATEMENT

All range statements must be assessed.

1. Personal protective equipment include:

- gloves
- safety eyewear/goggles
- protective clothing
- chemical apron
- respirators
- safety footwear
- face mask
- SCBA – self-contained breathing apparatus

2. Chemicals include:

- chlorine
- alum
- lime
- polymer
- High Test Hypochlorite (HTH)/sodium hypochlorite
- powder carbon
- Potassium permanganate
- corrosion inhibitors

3. Hazards include:

- toxicity
- corrosion
- high pressure
- burning of skin, lungs, eyes
- inhalation
- exposure level
- asphyxiation
- difficulty in breathing

4. Methods include:

- drop tests
- timed

UNDERPINNING KNOWLEDGE AND SKILLS

Candidates must know and understand:

1. what are the different types of chemicals used in water treatment
2. what are the purpose of the chemicals in water treatment
3. how to prepare batches of chemicals
4. what factors should be considered when preparing batches of chemicals
5. how to dose chemicals in water
6. how to measure chemical doses
7. what are the consequences of over- and under-dosing
8. what are the hazards associated with chemical dosing
9. how to read, understand and interpret the Material Safety Data Sheet (MSDS) for each of the chemicals

10. what is meant by compatibility and incompatibility of chemicals

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

a. select and wear personal protective equipment
b. prepare batches of chemicals
c. dose chemicals in water
d. measure chemical doses

(2) Method of Assessment

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.

(3) Context of Assessment

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

WW00013 Lift and Move Loads

Unit Descriptor:

This unit deals with the skills and knowledge required to effectively and safely lift and move materials in a safe and environment friendly manner. It applies to individuals working in the water and wastewater sector.

ELEMENTS		PERFORMANCE CRITERIA	
Candidates must be able to:			
1	Plan and prepare work	1.1	Recognize and adhere to Occupational Safety and Health requirements associated with tasks and workplace environment
		1.2	Select and wear assigned personal protective clothing when moving loads
2	Handle, sort and stack loads	2.1	Select materials for sorting and stacking according to supervisor's instructions and/or material specifications
		2.2	Identify handling characteristics of materials and apply manual handling techniques according to health and safety procedures
		2.3	Select safe and efficient routes for moving items according to supervisor's instructions and/or material specifications
		2.4	Apply specific handling requirements for hazardous materials according to approved organisation's procedures
		2.5	Store, stack and protect material in an approved location where they can be easily identified and retrieved
		2.6	Erect signage and barricades in order to isolate stored materials from workplace traffic or access where applicable
		2.7	Resolve problems within own area of personal responsibility and according to approved organization's procedures
		2.8	Report problems outside personal responsibility to designated personnel
3	Prepare for mechanical handling of materials	3.1	Stack/band material for mechanical handling in accordance with type of material and plant/equipment to be used
		3.2	Load, unload and move, material using mechanical handling procedures and material handling equipment

RANGE STATEMENT

All range statements must be assessed.

1. Personal protective equipment includes:

- hearing protection
- eye protection
- respirators
- protective clothing
- safety vests
- safety footwear
- safety helmets
- safety belts
- gloves

2. Protection of stacked/stored materials include:

- covering
- tying or banding
- use of barricades
- use of signs
- locking away (hazardous materials)
- use of storage bins

3. Material includes:

- pipes
- pipe fittings
- chemicals
- aggregates

UNDERPINNING KNOWLEDGE AND SKILLS

Candidates must know and understand:

1. what is the process of identifying loads which are safe to move
2. what are the reasons for planning a route when moving loads
3. what are safe handling techniques
4. what are company guidelines and procedures for safe handling and moving loads
5. what are the health and safety regulations for the safe handling and movement of loads
6. what are the consequences to self and others of using unsafe lifting and moving techniques

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

a. select and wear appropriate personal protective clothing
b. identify handling characteristics of materials
c. apply specific handling requirements for hazardous materials
d. store, stack and protect materials

(2) Method of Assessment

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.

(3) Context of Assessment

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

WW00022 Excavate Holes and Trenches in Ground and Pavement Structures

Unit Descriptor:

This unit deals with the skills and knowledge required to excavate holes and trenches in the ground and pavement structures. It describes the skills and knowledge required for preparing for excavation work as well as performing excavations on site

ELEMENTS		PERFORMANCE CRITERIA	
Candidates must be able to:			
1	Prepare for excavation work	1.1	Identify the work site and area to be excavated from the supervisor's work instructions and plans
		1.2	Select and use appropriate excavation methods for the surface and sub-surface materials being removed and ensure it meets the organisation's approved procedures
		1.3	Select tools and equipment and confirm they are suitable for the excavation method
		1.4	Confirm the position and size of excavation meets the requirements of the supervisor's work instructions and specifications
		1.5	Select, segregate and store excavated materials according to supervisor's work instructions and organization's standard operating procedures
2	Perform excavations on site	2.1	Perform excavation in a manner that avoids damage to supply apparatus and sub-structures
		2.2	Perform excavation in a manner that avoids damage to the natural environment as technically guided by supervisor
		2.3	Identify, support and protect exposed supply apparatus and sub-structures in accordance with work instructions
		2.4	Identify and report any damage to supply apparatus and sub-structures promptly to the supervisor
		2.5	Remove surplus materials in accordance with work instructions and requirements as directed by supervisor
		2.6	Confirm that the dimensions and condition of base of the excavation are in line with supervisor's work instructions
		2.7	Perform work according to approved procedures and practices and supervisor's instructions

2.8	Refer problems and conditions outside personal responsibility promptly to supervisor

RANGE STATEMENT

All range statements must be assessed.

1. Excavation methods include:

- hand method
- machine method

2. Hazards include:

- falls
- sharp edged tools
- asphyxiation
- toxic gas
- electric shock
- dangerous chemicals
- fires
- toxic and flammable gases and vapour
- explosions
- leaks or damaged supply apparatus
- damage to electrical supply apparatus
- cave-ins
- traffic
- insects/rodents/vermin
- lack of shoring

3. Tools and equipment include:

- hand tools- fork, crowbar, shovel, spade
- power tools- jack hammer/compressor
- motorised equipment
- road saw

4. Supply apparatus and sub-structures include:

- water
- electricity
- telephone
- gas
- sewer mains

UNDERPINNING KNOWLEDGE AND SKILLS

Candidates must know and understand:

1. what are the circumstances where ground support would be needed
2. what are the causes of instability in excavated areas
3. what are the circumstances where excavation supports must be installed
4. how to identify the different types of pavement surface
5. what are the types of sub-surface materials used for the different pavement surfaces
6. what are the main excavation methods, including hand and machine methods
7. what are the different types and range of tools and equipment used for hand and machine excavation
8. what are the hazards associated with working in excavations without natural or assisted ventilation
9. what are the types and function of the different supply apparatus and sub-structures that may be encountered during excavation work
10. how to identify the hazards associated with leaks or damaged supply apparatus and damage to electrical supply apparatus
11. what are the implications of using incorrect excavation practices
12. what are the implications of using incorrect materials
13. what are safe methods of storage or disposal of materials
14. why it is important to refer problems outside responsibility to the supervisor
15. what are the main responsibilities of the employer and employee under the health and safety act for work in excavations
16. what are the personal protective equipment (PPE) used for excavation work

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

a. select and use appropriate excavation methods
b. select appropriate tools and equipment
c. select and store excavated materials
d. perform excavation and avoid damage to supply apparatus and sub-structures
e. identify and protect exposed supply apparatus and sub-structures
f. identify and report damage to supply apparatus and sub-structures to supervisor

(2) Method of Assessment

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.

(3) Context of Assessment

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

WW00023 Prepare for the Reinstatement of Excavation and Pavement Surfaces

Unit Descriptor:

This unit deals with the skills and knowledge required to assist in preparing for reinstatement of excavation and pavement surfaces. It describes the skills and knowledge required to identify and protect supply apparatus and sub-structures, select and store materials for reinstatement and select tools and equipment to be used for reinstatement.

ELEMENTS	PERFORMANCE CRITERIA

Candidates must be able to:

1	Identify area for site works	1.1	Perform work to approved procedures and practices and in compliance with statutory requirements
		1.2	Identify and confirm the location of the excavation and the extent of reinstatement in accordance with supervisor's work instructions
		1.3	Identify the area and type of structure for reinstatement in accordance with supervisor's instructions
2	Prepare for reinstatement of excavation and pavement surfaces	2.1	Carry out preparation procedures for the reinstatement of excavation in accordance with the organizations' approved procedures and supervisor's instructions
		2.2	Report remedial work and defects in the excavation which are outside personal responsibility in accordance with supervisor's instructions
		2.3	Identify and protect supply apparatus and sub-structures in accordance with organization's standard operating procedures and supervisor's technical guidance
		2.4	Identify, select, handle and store materials for reinstatement according to supervisor's instructions
		2.5	Select and confirm that tools and equipment are appropriate for the materials to be used for reinstatement
		2.6	Identify that tools and equipment are in a condition suitable for use in accordance with the manufacturer's specifications and occupational safety and health requirements

2.7 Refer problems and conditions outside personal responsibility to supervisor

RANGE STATEMENT

All range statements must be assessed.

1. Preparation procedures include:

- edge trimming
- formation surface removal
- removal of loose debris
- repair formation

2. Materials include:

- new materials
- re-usable
  (for fine fill, backfill, sub-base, road base and pavement surface)

3. Tools and equipment include:

- vibrators
- vibrator rollers
- road saw
- compactors
- Klegg impact hammer
- tampers
- rakes
- spreaders
- sheep foot
- pneumatic
- pressure washer
- dump truck
- grabber truck
- trowel
- shovel

4. Supply apparatus and sub-structures include:

- utilities
- other agencies' structures

5. Reinstatement materials include:

- suitable fine fill materials
- suitable back-fill materials
- granular sub-bases
- road base materials
- bituminous road base materials
- surfacing materials
- concrete
- modular surfacing

6. Methods used to contain unstable soil include:

- shoring
- benching
- sloping sides

- oiling can
- bass broom

UNDERPINNING KNOWLEDGE AND SKILLS

Candidates must know and understand:

1. what are the different types of pavement structures
2. what are the preparation procedures for reinstating excavation and pavement surfaces
3. what are the sub-surface requirements for each type of pavement surface
4. what are the various types of excavation
5. what are the materials used for backfilling excavations
6. what are the remedial actions to take when material defects are encountered
7. what is the importance of complying with supervisor's safety and procedural instructions
8. what are the types of supply apparatus and sub-structures that may be encountered
9. what are the methods of protecting the different types of supply apparatus and sub-structures
10. how to achieve maximum compaction
11. how does moisture content affect compaction
12. what type and size of material is needed to ensure maximum compaction
13. what are the different techniques used to protect excavations

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

a. identify and confirm the location of the excavation
b. identify the area and type of structure for reinstatement
c. carry out preparation procedures for the reinstatement of excavation
d. identify, select, handle and store materials for reinstatement
e. select and use appropriate tools and equipment

(2) Method of Assessment

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.

(3) Context of Assessment

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.

WW00025 Perform Field Support Duties in the Construction and Maintenance of the Water Distribution System

Unit Descriptor:

This unit deals with the skills and knowledge required to provide support activity in the construction and maintenance of water distribution systems.

ELEMENTS	PERFORMANCE CRITERIA
Candidates must be able to:	
1 Establish site for water distribution system maintenance or construction	1.1 Prepare and maintain the work site in a safe condition and in accordance with the Occupational Safety and Health (OSH) requirements and regulations
	1.2 Plan traffic control at the work site in accordance with approved regulations and standards
	1.3 Locate underground and overhead obstructions and other utility services in order to avoid damage during construction, operation and maintenance of the water distribution system
	1.4 Select tools and equipment according to the job specifications
2 Carry out water distribution maintenance	2.1 Monitor and report on the condition of the water distribution system according to supervisor's instructions
	2.2 Respond to water distribution problems and the source of leaks /low pressures identified by tests according to supervisor's instructions
	2.3 Inspect water distribution system according to supervisor's instructions
	2.4 Locate and identify water distribution service and condition according to organization's approved procedures and supervisor's instructions
	2.5 Repair, replace or service defective pipes and components of pipeline network as required and according to supervisor's instructions
	2.6 Clean water distribution pipes and components according to standard operating procedures and methods
	2.7 Reinstate service after maintenance work has passed final

			inspection according to supervisor's instructions
3	Excavate trenches and manholes	3.1	Install dewatering equipment according to work instructions
		3.2	Perform tests according to supervisor's instructions
		3.3	Verify that trenches are backfilled with selected materials, compacted in layers and the surface is finished according to supervisor's instructions
4	Construct water distribution system	4.1	Check that trench bottom is prepared and pipe bedding is laid to specifications in accordance supervisor's instructions
		4.2	Construct water distribution system structures according to supervisor's instructions
		4.3	Position pipes in trench and fit valves, fittings and flow control devices according to supervisor's instructions
		4.4	Perform functional tests on mains and components according to supervisor's instructions
		4.5	Place water distribution system in service and monitor the performance of the system
5	Complete necessary documentation	5.1	Complete construction and maintenance job card according to supervisor's instructions
		5.2	Submit completed documentation to organization' s approved personnel

RANGE STATEMENT

All range statements must be assessed.

1. Pipes and components include:

- cast and ductile iron pipes
- reinforced and unreinforced concrete pipes
- Polyvinyl Chloride (PVC) pipes
- vitrified clay pipes
- High Density Polyethylene (HDPE)
- Medium Density Polyethylene (MDPE)
- steel
- galvanise GW1
- cast iron: flanged, flexible, sleeve, bell and spigot joints
- steel: butt and spigot and socket welded joints, and flanged joints
- Viking Johnson coupling and victaulic coupling
- PVC: insert fitting, flared compression rubber gasket and solvent welded joints
- concrete pipes: socket mortar, socket mastic and socket rubber ring
- vitrified clay: bell and socket
- asbestos
- fusion join

2. Cleaning methods include:

- power and hand-operated rods
- high velocity cleaners
- scrapers
- bucket machines
- chemical control
- flushing – conventional, unidirectional

3. Problems include:

- rodent and insect control

7. Valves include:

- stop valves/gate/butterfly
- non-return valves
- air release valves
- sluice
- Pressure Reducing Valves (PRV)
- Pressure Sustaining Valves (PSV)
- stop, gate, butterfly

8. Tests include:

- water and air pressure tests
- leakage
- infiltration tests
- visual
- gas detection

9. Tools and equipment includes:

- pneumatic tools
- pumps (trench, trash)
- blowers
- service vehicles
- chemical feeders

10. Standards include:

- OSH regulations and guidelines
- water authority standard operation procedures

11. Water distribution systems include:

- haul system
- piped system
- watering point

12. Components of pipeline networks include:

- hydrants –compression, toggle

- confined spaces
- cross-connections – back pressure, back siphonage

4. Materials include:

- concrete
- steel
- clay
- sand
- rock
- crushed rock
- plastic
- iron
- galvanise (GW1)

5. Structures include:

- manholes
- valve chambers
- thrust blocks
- pump chambers
- pipe supports

6. Documentation includes:

- sketches
- schedules
- time sheets
- maps
- plans

hydrant, wet barrel, dry barrel
- Reservoir types - below ground, ground level, elevated, hydropneumatic
- Hydrant parts – bonnet, upper barrel, lower barrel, shoe
- Concrete tanks - cast in place, pre-stressed

13. Operation and maintenance (O&M) include:

- testing for chlorine
- finding and repairing leaks
- testing for pressure
- flushing/once per year or as required
- maintenance of pipe routes(signage, brush cutting)
- inspecting fire hydrants
- locating and exercising valves
- cleaning storage reservoirs, screens, valves, hatches
- replacing pilot valves and seals
- inspecting pressure valves
- protection of pipe network (painting etc)

UNDERPINNING KNOWLEDGE AND SKILLS

Candidates must know and understand:

1. how to measure and calculate quantities
2. what are the methods of setting out
3. what are occupational safety and health requirements
4. what are construction and maintenance practices related to water distribution systems
5. what are work schedules and monitoring
6. what is work site traffic management

7. what are monitoring and testing methods and procedures
8. what are local environmental requirements
9. what is back siphonage and back pressure
10. why are air-relief valves installed
11. what type of piping is most resistant to corrosion
12. what is the minimum contact time when using the chlorine tablet method of disinfecting water mains
13. what types of piping materials are used in a water distribution system
14. what is 'water hammering'

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

a. select and use appropriate materials, pipes and components
b. check that safety requirements are adhered to
c. perform work activities whilst adhering to all standards

(2) Method of Assessment

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.

(3) Context of Assessment

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

WW00009 Work In Confined Spaces

Unit Descriptor:

This unit deals with the skills and knowledge required to effectively identify the location, and work procedure to be carried out in confined spaces; examine an entry plan for completeness; and enter, complete work and withdraw from a confined space.

ELEMENTS	PERFORMANCE CRITERIA

Candidates must be able to:

1	Identify the location and work procedures	1.1	Identify the location of the work according to standard operating procedures
		1.2	Identify the purpose and timing of the work procedure according to standard operating procedures
2	Enter, complete work and withdraw from a confined space	2.1	Read, interpret and understand the entry plan and seek clarification from supervisor, if necessary
		2.2	Follow the entry procedure according to the entry plan and company approved procedures
		2.3	Follow and carry out the entry plan requirements during the work procedure according to the standard operating procedures
		2.4	Follow entry plan for completion and personnel withdrawal according to standard operating procedures

RANGE STATEMENT

All range statements must be assessed.

1. Locations include:

- pipelines
- siphons
- intake chambers
- screen structures
- access chambers
- pump wet wells
- tanks
- reservoirs
- excavations
- tunnels
- valve chambers
- manholes

2. Entry plan includes:

- control of water entry
- lock out/tag out procedures
- external support personnel
- equipment use
- gas monitoring
- safety rope supports
- protective clothing use
- electrical precautions
- ventilation equipment
- safety harness and tripod

3. Purpose includes:

- cleaning
- equipment repair
- equipment inspection
- equipment maintenance
- equipment installation
- survey
- investigation
- blockage clearance

4. Requirements include:

- material
- tools and equipment

UNDERPINNING KNOWLEDGE AND SKILLS

Candidates must know and understand:

1. what are the locations which are considered confined spaces where work will be carried out
2. how to read and interpret an entry plan
3. how to enter, complete work and withdraw from a confined space
4. what is an entry plan
5. why it is important to seek clarification from the supervisor on issues related to the entry plan
6. what are the entry plan requirements

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

a. identify the location of the work
b. identify the purpose and timing of the work procedure
c. read, interpret and understand the entry plan
d. follow and carry out the entry plan requirements
e. follow entry plan for completion and personnel withdrawal

(2) Method of Assessment

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.

(3) Context of Assessment

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

GLOSSARY OF TERMS

Occupational Standards

Occupational Standards of competence are industry-determined specifications of performance, which describe the knowledge, skills and attitudes required by a worker in the performance of a particular role in the workplace. They specify what a person should know and do in order to carry out the functions of a particular job in the work environment. They are the building blocks for all activities in a competency-based training and certification system. An Occupational Standard is made up of a qualification plan, a unit title, elements, performance criteria, range statements, underpinning knowledge and skills and evidence guide.

Qualification Plan – The Qualification Plan identifies the Mandatory units which are those units that are necessary to deem a candidate competent in the occupational area and provide flexibility in different wok environments. It also contains the Title and Level of the qualification to be awarded.

Unit Title - The unit title is a succinct statement of the outcome of the unit of competency. It reflects the major activities or functions of an individual's work as well as the discreet units of work.

Unit Descriptor - The unit descriptor communicates the content of the unit of competency and the skill area it addresses.

Elements - These are the basic building blocks of the unit of competency. They describe the tasks in which competence should be demonstrated in order to carry out the specific function.

Performance Criteria - These are the descriptions of the outcomes of performance required for successful achievement of an element. They specify the required performance in relevant tasks, roles, skills and applied knowledge that enables competent performance.

Range Statement - This describes the essential operating conditions that should be present in training and assessment, depending on the work situation, needs of the candidate, accessibility of the item and local industry contexts. It lists the parameters in which candidates much demonstrate their competence.

Underpinning Knowledge and Skills – The knowledge identifies what a person needs to know to perform the work in an informed and effective manner. The skills describe the application of knowledge to situations where understanding is converted into a workplace outcome.

Evidence Guide - The Evidence Guide is critical in assessment as it provides information to Training Providers and Assessors about how the described competency should be demonstrated. It provides a range of evidence for the Assessor to make a determination of competence and defines the assessment context. The Evidence Guide describes:

- Conditions under which competency must be assessed including variables such as the assessment environment or necessary equipment

- 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 must be assessed over time, various contexts and with a range of evidence

Level 1 – Directly supervised worker

Recognizes competence in a range of varied work activities performed in a variety of contexts. Most work activities are simple and routine. Collaboration with others through work groups or teams may often be a requirement. Substantial supervision is required especially during the early months evolving into more autonomy with time.

Level 2 – Supervised skilled worker

Recognizes competence in a broad range of diverse work activities performed in a variety of contexts. Some of these may be complex and non-routine and involve some responsibility and autonomy. Collaboration with others through work groups or teams and guidance of others may be required.

Level 3 – Independent/autonomous skilled worker

Recognizes competence in a broad range of complex, technical or professional work activities performed in a wide variety of contexts, with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and the allocation of resources are often a requirement. The individual is capable of self-directed application, exhibits problem solving, planning, designing and supervisory capabilities.

Level 4 – Supervisory specialist worker

Recognizes competence involving the application of a range of fundamental principles and complex techniques across a wide and unpredictable variety of contexts. Requires very substantial personal autonomy and often significant responsibility for the work of others, the allocation of resources, as well as personal accountability for analysis, diagnosis, design, planning, execution and evaluation.

Level 5 – Managerial professional worker

Recognizes the ability to exercise personal professional responsibility for the design, development or improvement of a product, process, system or service. Recognizes technical and management

competencies at the highest level and includes those who have occupied positions of the highest responsibility and made outstanding contribution to the promotion and practice of their occupation.