MANAGE WATER RESOURCES QUALITY

UNIT CODE: CON/OS/CET/CR/08/6/A

UNIT DESCRIPTION

This unit covers the competencies required to manage water resources quality. It involves monitoring, managing water resources quality, managing groundwater quality, managing wastewater quality, treating, and disposing wastewater.

This standard applies in water sector.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the **key outcomes** which make up **workplace function**	These are **assessable** statements which specify the required level of performance for each of the elements. *Bold and italicized terms are elaborated in the Range*
1. Monitor water resources quality	1.1 Water quality reconnaissance survey is done based on the need
	1.2 *Environmental Water sampling sites* and *water resource quality indicators* are identified based on the reconnaissance survey
	1.3 *Matrices* for water resource quality monitoring are identified based on the reconnaissance survey
	1.4 *Tools and equipment* are identified based on the need
	1.5 Tools and equipment are operated and maintained based on standard operation procedures
	1.6 Water quality *monitoring protocol* is prepared based on need
	1.7 Water quality monitoring *schedules* are implemented based on the monitoring protocol
	1.8 Water quality monitoring report is prepared and submitted based on best practice
2. Surface Water quality management	2.1.Surface *water quality challenges and issues* are identified based on management need
	2.2.Surface water resources quality is characterized based on challenges and issues identified
	2.3.Surface water quality management plan is developed based on challenges and issues identified
	2.4.Surface water quality management plan is implemented based on challenges and issues identified
3. Ground Water quality management	3.1.*Ground water quality challenges and issues* are identified based on management need
	3.2.Groundwater resources quality is characterized based on challenges and issues identified

	3.3. Groundwater quality management plan is developed based on challenges and issues identified
	3.4. Groundwater quality management plan is implemented based on challenges and issues identified
4. Manage wastewater quality	4.6 *Sources* of wastewater identified based on characteristics
	4.7 Wastewater quality assessed based on selected parameters
	4.8 Wastewater quality assessment report prepared based on monitoring sites
	4.9 Wastewater is treated and disposed as per the environmental standards
	4.10 Wastewater quality assessment report interpreted based on monitoring plan
	4.11 Wastewater quality assessment report submitted based on best practices

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variables	Range
1. Surface water quality sampling sites may include but not limited to:	• Upstream • Hot spots • Effluent discharge points • Boreholes and wells • Regular gauging stations (RGS)
2. Groundwater quality sampling sites may include but not limited to:	• Boreholes • Wells • Springs
3. Water resources quality indicators may include but not limited to:	• Physico-chemical (e.g. pH, EC, TDS, DO, temperature, colour) • Inorganic chemical indicators (nitrates, phosphates) • Organic chemical (e.g. pesticides, detergents) • Microbial indicators (e.g. total coliforms E.coli, phytoplankton's, zooplanktons
4. Water resources quality matrices may include but not limited to	• Water • Macro organisms (e.g. fish, benthic macro-invertebrates, aquatic flora) • Sediments

5. Tools and equipment for monitoring water resources quality may include but not limited to:	• Portable water quality meters (pH, EC, TDS, thermometer, coli meter, DO meters • Water quality testing instruments: UV-Vis • GPS receiver • Samplers (manual, motorized, automated) • Remote sensing and GIS
6. Monitoring protocol may include but not limited to:	• Surveillance • Pollution control • Emergence preparedness and disaster response
7. Schedules may include but not limited to	• Monthly • Quarterly • Annual
8. Water resources quality challenges and issues may include but not limited to:	• Soil erosion • Human settlement (e.g. anthropogenic pollutants, deforestation, • Agricultural activities (e.g. fertilizers, pesticides etc.) • Industrial activities (e.g. industrial chemical pollutants, thermal pollution etc.) • Municipal waste (e.g. solid waste, leachates etc.) • Extreme weather events (e.g. flooding, siltation) • Over abstraction (e.g. sedimentation)
9. Sources	• Industries • Hospitals • Residential

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

General skills:

- Communication
- Computer
- Analytical/research
- Organizing
- Data collection
- Decision making
- Planning
- Problem solving
- Supervising
- Time management

- Occupational Safety and health

Technical skills:
- Mapping
- Water sampling
- Water quality testing
- Instrumentation
- Data analysis
- Reporting
- Record keeping
- Operation and maintenance

Required Knowledge

The individual needs to demonstrate knowledge of:
- Instrumentation
- Water resources management
- Technical specifications
- Statutory regulations
- Occupational health and safety
- Quality Assurance
- Standard operating procedures
- Hydrology
- Integrated Water Resources Management
- Environmental science
- Water quality
- Water Act 2016

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate:
	1.1 Monitored water resources quality
	1.2 Managed Surface Water quality
	1.3 Ground Water quality management
	1.4 Manage wastewater quality
2. Resource Implications	The following resources should be provided:
	2.1 Functional water quality laboratory (e.g. sampling devices, portable water testing kits and equipment, preservation devices, laboratory reagents)
	2.2 Computers with GIS software
	2.3 Digital cameras

		2.4 GPS
		2.5 Personal Protective Equipment
3.	Methods of Assessment	Competency may be assessed through: 3.1 Written tests 3.2 Observation 3.3 Interview 3.4 Oral questions 3.5 Third party report(supervisor)
4.	Context of Assessment	Assessment may be done: 4.1 On–the–job 4.2 Off-the –job 4.3 Industrial attachment 4.4 Field studies 4.5 Course work 4.6 Laboratory practice
5.	Guidance information for assessment	Holistic assessment with other units relevant to the building sector workplace and job role is recommended.

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