**Introduction**

**Federal Democratic Republic of Ethiopia**

**Occupational Standard**

 **Water Supply and sanitation Management**

**NTQF Level V**

*Ministry of Education*

*February 2017*

Ethiopia has embarked on a process of reforming its TVET-System. Within the policies and strategies of the Ethiopian Government, technology transformation – by using international standards and international best practices as the basis, and, adopting, adapting and verifying them in the Ethiopian context – is a pivotal element. TVET is given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

The Ethiopia Occupational Standard (EOS) is the core element of the Ethiopian National TVET-Strategy and an important factor within the context of the National TVET-Qualification Framework (NTQF).They are national Ethiopian standards, which define the occupational requirements and expected outcome related to a specific occupation without taking TVET delivery into account.

This document details the mandatory format, sequencing, wording and layout for the Ethiopian Occupational Standard comprised of Units of Competence.

A Unit of Competence describes a distinct work activity. It is documented in a standard format that comprises:

* Occupational title, NTQF level
* Unit code
* Unit title
* Unit descriptor
* Elements and Performance criteria
* Variables and Range statement
* Evidence guide

Together all the parts of a Unit of Competence guide the assessor in determining whether the candidate is competent.

The ensuing sections of this EOS document comprise a description of the respective occupation with all the key components of a Unit of Competence:

* chart with an overview of all Units of Competence for the respective level including the Unit Codes and the Unit Titles
* contents of each Unit of Competence (competence standard)
* occupational map providing the technical and vocational education and training (TVET) providers with information and important requirements to consider when designing training programs for this standards, and for the individual, a career path

**UNIT OF COMPETENCE STANDARD CHART**

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Occupational Code: EIS WSM** |
| ***NTQF Level V***[EIS WSM5 03 0217](#EIS_WSM_03)Manage budgets and financial plans[EIS WSM5 01 0217](#EIS_WSM_01)Manage a civil works [EIS WSM5 02 0217](#EIS_WSM_02)Manage contracts |
| [EIS WSM5 06 0217](#EIS_WSM_06)Undertake project investigation [EIS WSM5 12 0217](#EIS_WSM_12)Implement and manage water treatment processes monitoring program[EIS WSM5 09 0217](#EIS_WSM_09)Capture, store, collate and interpret spatial data[EIS WSM5 04 0217](#EIS_WSM_04)Manage people performance[EIS WSM5 05 0217](#EIS_WSM_05)Prepare detailed works project documentation[EIS WSM5 07 0217](#EIS_WSM_08)Prepare preliminary design for operational works[EIS WSM5 08 0217](#EIS_WSM_09)Collect, organize and interpret statistical data [EIS WSM5 11 0217](#EIS_WSM_11)Develop and review wastewater treatment management plan[EIS WSM510 0217](#EIS_WSM_10)Apply Principles of Hydraulics Pipe and Channel Flow[EIS WSM5 15 0217](#EIS_WSM_15)Facilitate and Capitalize on Change and Innovation[EIS WSM5 14 0217](#EIS_WSM_14)Manage Project Quality[EIS WSM5 13 0217](#EIS_WSM5_13)Implement and Manage Potable Water Distribution SystemManagement Plan[EIS WSM5 17 0217](#EIS_WSM_17)Manage Continuous Improvement Process (Kaizen)[EIS WSM5 16 0217](#EIS_WSM_16)Establish and Conduct Business Relationships |

**NTQF level V**

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Manage a civil works**  |
| **Unit Code** | **[EIS WSM5 01 0217](#EIS_WSM_01_1116)** |
| **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. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1.Evaluate and assess the project | 1.1. A site evaluation is organized 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 organized 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 organized 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.  |
| 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, organization 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.  |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Relevant legislation and standards  | May include:* OHS
* quality assurance, including relevant Australian standards
* environmental legislation
* council regulations and by-laws
 |
| Contingency plans  | May include:* weather changes
* worker injuries or illnesses
* worker absences
* supply breakdowns
* machinery failures
 |
| Communication strategies  | May include:* regular meetings with clients
* regular meetings with field staff.
 |
| Service providers  | May include:* internal staff
* contractors
* contract specialists.
 |
| Documentation  | May include:* job cards
* budgets
* cost centers
* check sheets
* safety rule procedures
* plant records
* drawings
* quality assurance procedures and documentation
* maintenance procedures
* codes of practice
* contract specifications.
 |
| Resources  | May include:* materials
* plant
* equipment, including specialist equipment
* tools
* finances
* specialist contractors and personnel
 |
| Project plans  | May include:* Gantt charts
* PERT charts.
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* 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.
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* 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.
 |
| Underpinning Skills | Demonstrates skills to:* contingency management
* applying quality assurance and quality control procedures
* identifying sources of errors
* coordinating work scope
* priority management and organizational 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.
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Manage contracts** |
| **Unit Code** | **[EIS WSM5 02 0217](#EIS_WSM_02_1116)** |
| **Unit Descriptor** | This unit covers the ability to manage contracts which includes undertaking preparations, establishing , maintaining contract management arrangements, monitoring, maintaining contract performance, and completing and reviewing contracts.  |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1. Prepare to manage a contract | 1.1. Contract 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 organizational requirements.1.2. Operational elements of the contract are confirmed and contact is made with specialists and stakeholders to clarify and assist with contract administration issues.1.3. Key contract clauses are identified and their content is clarified as necessary to ensure contract requirements are understood.1.4. Process, timings, and key performance indicators are identified from the contract and confirmed with stakeholders.1.5. Risks are confirmed and a risk management plan is developed or reviewed in line with contract requirements and organizational policy and procedures.1.6. Contract management strategy is developed or obtained and key details are entered from the contract.1.7. Contract management team is formed and roles and responsibilities are allocated. |
| 2. Implement a contract management strategy | 2.1. Start-up or transition arrangements are confirmed and implemented according to contract requirements and organizational procedures.2.2. Information and communication strategies are established to meet contractor, stakeholder and organizational needs.2.3. Risk management plan is monitored for effectiveness and adapted as necessary during the life of the contract.2.4. Relationship with contractors and stakeholders is established and managed according to organizational policy and procedures and probity requirements.2.5. Specialist expertise is obtained as necessary for progress meetings and for advice on or resolution of contract issues.2.6. Consideration is given to OHS, environmental and sustainability principles and corporate social responsibility principles as they apply to the contract.2.7. Contract information/documentation is maintained for organizational purposes according to organizational policy and procedures. |
| 3. Monitor and maintain performance of a contract | 3.1. Obligations to contractor and stakeholders are met according to contractual arrangements and organizational financial management requirements.3.2. Monitoring and control measures and performance indicators are used to manage performance of contract and ensure that all obligations under the agreement are being met.3.3. Contract variations are managed in accordance with the contract, organizational policy and procedures, and probity requirements.3.4. Disputes and complaints are investigated and resolved or referred according to contract requirements.3.5. Negotiation of issues relating to the contract is managed and approvals are obtained according to stipulations in the contract proper.3.6. Communication is maintained with all stakeholders on the performance of the contract according to organizational protocols and public sector standards. |
| 4. Complete and review contract. | 4.1. Client satisfaction with contract deliverables is confirmed.4.2. Contracts are finalized, amended, cancelled or terminated according to contractual arrangements.4.3. Strategies are applied to manage close-out, and ensure renewal of contract or transition to a new contract meet organizational guidelines, probity requirements and public sector standards.4.4. Review is undertaken of contract management, contractor performance relevant to measures at each stage of the contract, user satisfaction and audit results, when necessary.4.5. Where measures or outcomes are not met in full, variances are documented and explained.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. |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 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 organization
* other public sector organizations
* employees, unions and staff associations
* industry bodies
* local communities
* lobby groups and special user groups
 |
| Key contract clauses | May include:* specifications
* variations
* insurances
* notices
* disputes
* intellectual property
* privacy
* confidentiality
* milestones
* payments
* breaches
* penalties
* expected standards of behavior
 |
| Risks | May include:* contractor inability to meet agreements
* end user or buyer inability to meet obligations
* limited number of suppliers
* corruption risks
* probity risks
 |
| Contract management strategy | May include:* formal contract management plan
* contract management checklist
* setting up routines
* checking quality assurance systems
* transferring legal responsibility
* avoiding implied acceptance of varied conditions through non-enforcement of contractual obligations
* applying environmental, sustainability and corporate responsibility principles
 |
| Communication strategies | May include:* setting regular times to talk, meet or check on progress
* protocols for dealing with other stakeholders
* emergency contact arrangements
* diary system to monitor milestones, timeframes, receipt of deliverables, etc.
* strategies for ensuring information flow at critical stages of the contract
 |
| Monitoring and control measures | May include:* inspections
* tests
* audits
* reviews
* meetings
* progress reports
* verifications
* identification of non-conformances
* corrective actions
 |
| Contract variations | May include:* change of scope
* change in prices
* change in quantity
* change to specifications
* negotiation of new terms and conditions
* dissolution of contracts
* in writing
* verbal variations, confirmed in writing
* variations by action/inaction
 |
| Disputes | May include:* disputes over:
* requirements
* delivery schedules
* price changes
* additional tasking
* payment schedules
* complaints from third parties
 |
|  resolve  | May include:* conference
* negotiation
* mediation
* expert determination
* arbitration
* resort to contractual conditions
* legal considerations
 |
| Negotiationof issues | May include:* contract variations
* continuous improvement
* innovations
* non-compliance
* consequences
 |
| Review | May include:* planning process
* evaluation considerations at each stage of the contract
* sources and methods of gathering data
* role of audit trails, where applicable
* measuring outputs
* meeting client needs
* considering new and different ways of delivering the service or product in the future
* strategies for continuous improvement
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* develop a contract management strategy in consultation with key stakeholders
* develop a suitable contract management plan, using templates if available
* implement the contract management plan
* manage the performance of contractors
* provide contractors with performance feedback
* manage contract disputes to achieve prompt resolution and refer to higher authority when necessary
* review contracts throughout to identify opportunities for continuous improvement
* act within own delegations and refer issues to higher authority when necessary
* uphold probity standards in all dealings with contractors.
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* 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
* organizational procurement policies, practices and approval processes
* contract performance management
* privacy and confidentiality issues
* probity principles and issues
* codes of conduct, codes of practice and standards of individual behaviour relating to managing contracts and relationships with contractors
* whole-of-life considerations relating to the ownership, operation and disposal/completion of the goods or services
* equal employment opportunity
* financial and accounting issues relevant to the contract
 |
| Underpinning Skills | Demonstrates skills to:* 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 organizing skills to manage contract documentation
* learning skills to keep up-to-date with relevant procurement legislation, policies and procedures
* technology skills to:
* operate organizational IT systems
* use electronic procurement templates
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Manage budgets and financial plans** |
| **Unit Code** | **[EIS WSM5 03 0217](#EIS_WSM_03_1116)** |
| **Unit Descriptor** | 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. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1. Plan financial management approaches | 1.1. Access budget/financial plans for the work team1.2. Clarify budget/financial plans with relevant personnel within the organization to ensure that documented outcomes are achievable, accurate and comprehensible1.3. Negotiate any changes required to be made to budget/financial plans with relevant personnel within the organization1.4. Prepare contingency plans 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 members2.2. Provide support to ensure that team members can competently perform required roles associated with the management of finances2.3. Determine and access resources and systems to manage financial management processes within the work team |
| 3. Monitor and control finances | 3.1. Implement processes ***to monitor actual expenditure*** and to control costs across the work team3.2. Monitor expenditure and costs on an agreed cyclical basis to identify cost variations and expenditure overruns3.3. Implement, monitor and modify contingency plans as required to maintain financial objectives3.4. Report on budget and expenditure in accordance with organizational protocols |
| 4. Review and evaluate financial management processes | 4.1. Collect and collate for analysis, data and information on the effectiveness of financial management processes 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 processes4.3. Implement and monitor agreed improvements in line with financial objectives of the work team and the organization |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Budget***/***financial plans | May include:* cash flow projections
* long-term budgets/plans
* operational plans
* short-term budgets/plans
* spreadsheet-based financial projections
* targets or key performance indicators for production, productivity, wastage, sales, income and expenditure
 |
| Relevant personnel | May include:* financial managers, accountants or financial controllers
* supervisors, other frontline managers
 |
| Contingency plans | May include:* contracting out or outsourcing human resources and other functions or tasks
* diversification of outcomes
* finding cheaper or lower quality raw materials and consumables
* increasing sales or production
* recycling and re-using
* rental, hire purchase or alternative means of procurement of required materials, equipment and stock
* restructuring of organization to reduce labor costs
* risk identification, assessment and management processes
* seeking further funding
* strategies for reducing costs, wastage, stock or consumables
* succession planning
 |
| Support | May include:* access to specialist advice
* documentation of procedures
* help desk or identified experts within the organization
* information briefings or sessions
* intranet-based information
* training including mentoring, coaching and shadowing
 |
| Required roles | May include:* arranging for use of corporate credit cards
* banking
* debt collection
* ensuring security, accuracy and currency of financial operations
* invoicing clients, customers and consumers
* maintaining journals, ledgers and other record keeping systems
* maintaining petty cash system
* purchasing and procurement
* wages and salaries payments and record keeping
 |
| Resources and systems | May include:* hardware and software
* human, physical or financial resources
* record keeping systems (electronic and paper-based)
* specialist advice or support
 |
| Processesto monitor actual expenditure | May include:* reporting of:
* assets
* consumables
* equipment
* expenditure
* income
* stock
* wastage
 |
| Reporting | May include:* bank statements
* credit card statements
* financial reports
* invoices and receipts
* ledgers and journals
* logs
* petty cash records
* spreadsheet-based records
 |
| Data and information on the effectiveness of financial management processes | May include:* bank account records
* cash flow data
* contracts
* credit card receipts
* employee timesheets
* files of paid purchase and service invoices
* income and expenditure
* insurance reports
* invoices
* job costing
* petty cash receipts
* quotations
* taxation records
* wages/salaries books
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* financial skills required to work with and interpret budgets, ageing summaries, cash flow, petty cash, GST, and profit and loss statements
* knowledge of the record keeping requirements for the ATO and for auditing purposes.
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* basic accounting principles
* organizational requirements related to financial management
* relevant legislation and current requirements of the Australian Taxation Office, including GST
* requirements for organizational record keeping and auditing
* principles and techniques involved in:
* budgeting
* cash flows
* electronic spreadsheets
* GST
* ledgers and financial statements
* profit and loss statements.
 |
| Underpinning Skills | Demonstrates skills to:* numeracy skills to read and understand a budget and to update a budget
* technology skills to use software associated with financial record keeping.
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Manage people performance and Relationships** |
| **Unit Code** | **[EIS WSM5 04 0217](#EIS_WSM_04_1116)** |
| **Unit Descriptor** | This competence standard covers the process of Managing people’s performance and relationships .It requires the ability to collect and analyze information on people’s performance, application of skills and knowledge to provide information and guidance to personnel in the conduct of their duties, facilitate staff discussions and agreements, and provide constructive evaluation to staff members and all aspects of employee relations impacting on managers. It seeks to develop and maintain a positive and productive workplace environment at all times. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1. Communicate work roles
 | * 1. Roles and responsibilitiesof staff are clearly defined and documented.
	2. Skills of staff are accurately identified and matched with available tasks and duties.
	3. Requirements of jobs are clearly identified and communicated to personnel.
	4. Information on activities are developed and provided to personnel.
	5. ***OHS*** policy and procedures are effectively communicated and implemented.
 |
| 2.Coordinate activities | 2.1 Work activities are prioritized to ensure completion of outcomes in accordance with available timelines.2.2 Work plans are developed to establish appropriate targets and objectives of activities.2.3 Training and learning opportunitiesare identified and incorporated into work activities.2.4 Supervisory and reporting responsibilities are clear and maintained in line with organizational requirements.2.5 Enterprise environmentalpolicy and procedures are effectively communicated and implemented. |
| 3.Establish personal work goals | 3.1 Personal qualities and performance serve as a positive role model in the workplace3.2 Personal work goals and plans reflect the organization’s Plans personal plans, responsibilities and accountabilities3.3 Action is taken to achieve and extend personal work goals beyond those planned3.4 Consistent personal performance is measured and  maintained in varying work conditions and work  contexts priorities and commitments |
| 4. Set and meet own work priorities | 4.1 Competing demands are prioritized to achieve personal, team and the organization’s goals and objectives4.2 Technology is used efficiently and effectively to manage work |
| 5.Develop and maintain professional competence | 5.1 Personal knowledge and skills are assessed against competency standards to determine development needs and priorities5.2 Feedback from clients and colleagues is used to identify and develop ways to improve competence5.3 Management development opportunities suitable to personal learning style(s) are selected and used to develop competence5.4 Participation in professional networks and associations enhances personal knowledge, skills and relationships |
| 6. Implement employee relations strategy and policies for own work area | 6.1 ***Employee relations***strategy is consistent with organizational strategic objectives6.2 Strategies/policies provide for consultation with andparticipation by, relevant groups and individuals6.3 Strategies and policies are developed through the application of a risk management approach and extensive consultation6.4 ***Strategy and policies***take account of equal opportunity, family/work relationships and ensure the absence of discrimination and/or harassment6.5 ***Risk management***strategies are developed which take account of the withdrawal of labour and other potential outcomes of disputes6.6 Strategies and policiestake account of the objectives of relevant groups and individuals and identify potential areas of conflict (if any) |
| 7. Build and maintain a productive culture | 7.1 Awards, agreements, and contracts which balance  organizational objectives and ***employee rights and***  ***obligations*** are negotiated7.2 Conditions of employmentmeet all legal an organizational requirements and are conducive to job satisfaction7.3 Consultation and communication is regular, timely and engenders support for the productive culture7.4 Policies and practices ensure employee recruitment,  retention and satisfaction objectives are met7.5 Induction and training develops competence and confidence to ensure work is performed safely and effectively7.6 Employees understand their role and how it contributes to the achievement of organizational objectives7.7 Individual and team development plans are in place and regularly reviewed and updated7.8 Employee relations policies are regularly evaluated and Improved |
| 8. Resolve employee relations problems | 8.1 Processes have been established for early intervention to identify and minimize problems/grievances8.2 Problem solving processesare communicated to, and  Supported by, all relevant groups and individuals8.3 Competence in managing conflict negotiation skills and dispute resolution is developed through appropriate training and preparation8.4 Specialist advice is taken where appropriate and/or where formal hearings are required8.5 Processes are fair and equitable and consistent with all relevant awards agreements and legislation8.6 ***Problem solving processes***provide for external mediation and conciliation where appropriate8.7 Process provides for arbitration of disputes as a last resort and only where appropriate |

|  |  |
| --- | --- |
| **Variables** | **Range** |
| OHS  | May include:* maintaining knowledge of OHS legislation, principles and
* practice within context of Organization's operations and plans
* inclusion of OHS in personal work priorities within context of organization
 |
| Employee relations  | May include:* all of the activities in an Organization which impact on the
* employees' terms and conditions of employment and their
* personal well-being and satisfaction with their work

environment |
| Strategies and policies | May include:* selection/recruitment
* induction and training
* performance management
* discipline
* equal opportunity
* sexual harassment
* racial discrimination/vilification
* industrial/labour relations
* remuneration and benefits
* human resource strategy
* organizational values statement
 |
| Risk management  | May include:* the process of identification of potential negative events and the development of plans to mitigate or minimize the likelihood of the negative event occurring and/or the consequences in the event it does occur
 |
| Employee rights and obligations  | May include:* those contained within any award agreement or contract of employment, or implied terms of those agreements, together
* with all rights and obligations under the laws of the

commonwealth and the relevant state/territory |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | A candidate must be able to demonstrate ability to: * Supervise and instruct staff to achieve work activities.
* Delegate and allocate tasks.
* Assess and evaluate staff competency.
* Identify and provide training requirements.
* Plan and monitor ongoing training needs.
* Prepare personal work plan
* Establish personal work priorities
* Assess own performance
* Identify and act on own management development needs
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* Enterprise personnel processes.
* Enterprise organizational structure and responsibilities.
* Techniques for building trust and relationships.
* Principles of team work and negotiation.
* Performance appraisal systems and procedures.
* Principles of time management.
* Conflict management techniques.
* Relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, and industrial Principles and techniques of:
* identifying personal behavior, self awareness, personality traits
* establishing a personal development plan
* The organization’s policies, plans and procedures
* The types of work methods and practices which can improve personal performance
* The types of learning style(s) and how they relate to the Individual
* Performance measurement systems utilized within the organization
* Key result areas of the organization
* Human resource specialist assistance available
* Organizational plans and objectives (strategic, tactical and

  |
| Underpinning Skills | Demonstrates skills to:* Skills include the ability to:
* Supervise and instruct staff to achieve work activities.
* Delegate and allocate tasks.
* Assess and evaluate staff competency.
* Identify and provide training requirements.
* Plan and monitor ongoing training needs.
* interpret written and oral information about workplace requirements
* Research information to develop personal and work plans
* Elicite, analyze and interpret feedback
* Analyze culturally different viewpoints and taking them into account in personal and work plans
* Monitor workplace trends related to work role and responsibilities
* Use information systems to assist establish work plans
* Assess the effectiveness of own management development
* Develop and maintaining professional networks
* relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
* analyze, identify and develop mitigation strategies for identified risks
* Communicate to ensure all relevant groups and individuals are advised of what is occurring and are provided with an opportunity for input
* mediate, negotiate and/or attempt to obtain consensus between individuals/groups
* Networking skills to ensure support from key groups and
* individuals for concepts/ideas/products/services
* Ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Prepare detailed works project documentation** |
| **Unit Code** | **[EIS WSM5 05 0217](#EIS_WSM_05_1116)** |
| **Unit Descriptor** | This unit covers preparing relevant project documentation including specifications, key invoices and estimates. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1.Prepare design program | 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**.** Undertake design and prepare working drawings | 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.Prepare work specifications | 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. Prepare detailed estimate | 4.1. Detail drawings are utilized 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 coasted. 4.4. An estimate for ***contingencies*** is made within prepared estimates. 4.5. The cost of project support resources is included in detailed estimates.  |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Design elements | May include:* building regulations
* Ethiopian standards
* state road authority
* design manuals
* Ethio-road 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 labor
* contract labour.
 |
| Council requirements  | May include:* works specifications
* design procedures.
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* Drawings are undertaken to meet established standards.
* Works specifications are prepared.
* Estimates are detailed and include contingencies.
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* federal and state government acts
* local government regulations
* design standards and specifications
* drawing standards and specifications
* interpretation and analysis of resources costing.
 |
| Underpinning Skills | Demonstrates skills to:* interpreting relevant acts, regulations, codes, policies, procedures and standards
* interpreting engineering design criteria
* engineering drafting
* calculating weight, volume, ratio and quantity.
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Undertake project investigation**  |
| **Unit Code** | **[EIS WSM5 06 0217](#EIS_WSM_06_1116)** |
| **Unit Descriptor** | This unit covers undertaking the research of a works project to determine scope and relevant stakeholders. |

|  |  |
| --- | --- |
| **Elements** | **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*** .  |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 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

May include:* cross-sectional
* people opinion survey
* detailing and locating services such as gas, water, electricity and telecommunications.
 |
| Drafting standards  | May include:* Ethiopian standards code for building and engineering ES1100 - 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.
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* Liaison with council and other customers is undertaken.
* Design parameters are identified.
* Impact of project on assets and environment is identified
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* assets network
* design and drafting principles
* related government bodies
* contractual requirements
* acts, regulations, standards and codes of practice
* council budget cycle.
 |
| Underpinning Skills | Demonstrates skills to:* interpersonal communication techniques
* time management
* risk management
* high level negotiation skills
* presenting plans
* collating data
* research expertise.
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Prepare preliminary design for operational works** |
| **Unit Code** | **[EIS WSM5 07 0217](#EIS_WSM_08_1116)** |
| **Unit Descriptor** | This unit covers preparing works related to preliminary design for community consultation and council approval |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1.Establish design criteria | 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.Prepare alternative concepts | 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.Conduct a safety design audit | 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.Obtain project approvals | 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.Finalize public consultation and prepare report to council | 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.  |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Design  | May include:* erosion and sediment control plan references
* Ethiopia design standards.
 |
| 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 organizations.
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* Ethiopian design standards are applied.
* Review of environmental factors for maintenance and construction projects is conducted.
* Safety design audit is undertaken.
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* relevant government authorities and council procedures and policies
* relevant legislation, codes of practice and standards
* contractual and legal requirements
* environmental management strategy
* design standards.
 |
| Underpinning Skills | Demonstrates skills to:* 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.
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Collect, organize and interpret statistical data for work**  |
| **Unit Code** | **[EIS WSM5 08 0217](#EIS_WSM_09_1116)** |
| **Unit Descriptor** | This unit describes the skills and knowledge to collect, organise, illustrate, summarise and interpret a range of statistical data for work. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1. Prepare to undertake a work related statistical investigation | 1.1 Identify workplace issue requiring investigation1.2 Determine audience1.3 Identify ***data*** *t*o be collected1.4 Select a ***method to collect data*** |
| 2. Undertake statistical investigation using discrete data | 2.1 Collect and organise appropriate statistical data2.2 Illustrate data in appropriate formats2.3 Compare effectiveness of different ***types of graphs***2.4 Calculate the summary statistics for collected data2.5 Interpret the results |
| 3. Extract and interpret information from statistical investigation. | 3.1 Check that the data meets the expected results and content3.2 Extract and interpret information from the results including tables, graphs and summary statistics3.3 Use mathematical language and symbols to report results of investigation control. |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Data  | May include:* Raw Data
* Primary and Secondary data
* Survey data
 |
| Method of data collection  | May include:* Senses
* Sampling Include
* Interview
* Questioner
* Observation
 |
| types of graphs  | May include:* Bar chart
* Pie chart
* Radar chart
* Combo chart
* Column chart
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Demonstrate knowledge and skills to:* use one or two methods to collect data
* calculate summary statistics and interpreting results
* illustrate data using workplace appropriate methods
* Interpret information in tables, and graphs.
* Record different data according to organizational standard
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* Methods of data collection
* Difference between discrete and continuous data
* Types of graphs.
* Basic organizational policies and guidelines, such as OHS guidelines
* Basic characteristics, capabilities and limitations of tools, technology and equipment used.
 |
| Underpinning Skills | Demonstrates skills to:* Prepare, analyze, Interpret and summarize of data
* Draw graphs to describe collected data
* accurately record and collate
* undertake basic computations
* organizational skills to prioritize daily activities
* spatial skills to:
* perform basic spatial and a spatial data collection in an accurate manner
* use spatial information technology to perform basic data collection
* work effectively as part of a team
* use a range of equipment in the field safely, accurately and as required for the task
* problem solving (basic)
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title** | **Capture, store, collate and interpret spatial data** |
| **Unit Code** | [**EIS WSM5 09 0217**](#EIS_WSM_09_0217) |
| **Unit Descriptor** | This unit of competency specifies the outcomes required to capture new data, Store and Retrieve , Collate and Interpret Spatial data using a variety of methods. It requires the ability to plan and execute the data capture Store and Retrieve , collected and interpret spatial data, 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 organizational guidelines |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1.Prepare for data collection | 1. Key activities and timelines are scheduled with full consideration given to specification, available resources and organizational requirements.
2. Administrative and legal requirements for data collection are complied with and recorded.
3. Appropriate persons or relevant personnel are informed about the project.
4. Equipment, supplies and spatial information services (SIS) technologies are selected according to the task requirements.
5. Designated responsibilities are communicated to staff to ensure clarity of understanding of the work and provide a basis for ongoing assessment.
6. Skills and knowledge are updated to accommodate changes in data capture techniques.
 |
| 2.Gather data | 1. Equipment is operated according to manufacturers’ specifications, and statutory and organizational guidelines.
2. Entities are related to a reference system based on the specifications.
3. Data and attributes are collected using methodologies detailed in the data capture methodology.
4. Metadata is documented according to accepted industry standards.
5. Any discrepancies between specifications and actual activities are identified, recorded and reported.
6. Administrative and legal requirements for data collection are complied with and recorded.
7. Guidance is given to staff assisting in the data collection process.
8. OHS requirements are planned for and adhered to.
 |
| 3.Store spatial data | 1. Data index is created to assist in retrieval and storage according to organizational spatial data and legal requirements.
2. Administrative and legal requirements are complied with and recorded for data storage.
3. Data are recorded in index according to organizational guidelines***.***
 |
| 4. Access and retrieve spatial data | 1. Indexing system is used to locate spatial data source.
2. Spatial data are translated into required format where necessary.
 |
| 5. Back up spatial data | 1. Spatial data are backed up according to organizational guidelines.
2. Method of spatial data storage is selected according to organizational guidelines.
3. Distribution method is determined to ensure that the most current data is available.
4. Skills and knowledge are updated to accommodate changes in data storage and retrieval processes.
 |
| 6.Query and interpret data | 1. Relevant sources and data are identified and accessed.
2. Data are queried and interpreted using appropriate equipment or software package according to client requirements.
3. Data are verified for relevance using descriptive and analytical techniques.
4. Irregularities are resolved using initiative.
5. Skills and knowledge are updated to accommodate changes in data.
6. Results are recorded and documented according to organizational and client requirements.
7. OHS requirements are planned for and adhered to.
 |
| 7.Collate data | 1. Spatial and spatial requirements are collated to meet organizational needs***.***
2. Most appropriate format and database are selected according to organizational requirements.
3. Legal and ethical requirements are addressed.
 |
| 8.Test and validate collated spatial data | 1. Tools for testing the validity of the information and data are identified and accessed or developed.
2. Links with other functional areas and management systems are identified and facilitated to ensure comprehensive information and data collection.
3. Quality and use ability of data are ensured according to organizational guidelines.
 |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Administrative and legal requirements | May include:* access protocols and obligations
* Ethiopia standards, quality assurance and certification requirements
* award and enterprise agreements
* licensing arrangements
* organizational protocols for accessing physical, financial and human resources
* reimbursements
* Indigenous considerations
* relevant codes of practice
* relevant state, territory and federal legislation affecting organizational 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
 |
| Appropriate persons or relevant personnel | May include:* administrative staff
* assessors
* colleagues
* contractors
* field survey staff
* land occupiers
* land owners
* managers
* supervisors
* technicians
* trainers
 |
| Equipment***,*** suppliesand spatial information services ***(***SIS***)*** technologies | May include:* data logger or other mobile computing device
* data recording equipment
* 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
* clinometers
* distance measuring wheel
* personal digital assistant
* personal computer-based digitizing boards
* sonar
* tide gauge
* tools
* total station
* ultra high frequency (UHF) radio
* vehicles
 |
| manufacturers’ specifications | May include:* electronic format
* equipment specifications
* operator manuals
* printed product instructions and information
* spatial database
* warranty documents
 |
| Entities | May include:* event
* object
 |
| reference system | May include:* global
* local
* regional
 |
| attributes | May include:* condition
* date
* size
* type
 |
| data capture methodology | May include:* aerial
* conversion or translation from existing information (hard copy or digital)
* data dogging
* digitizing theodolite
* direct or indirect
* field
* GPS scanning
* manual entry
* photogrammetric
* remote sensing
* sonar
* survey
* total station
 |
| Metadata | May include:* summarized 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
 |
| Method of spatial data storage | May include:* digital
* hard copy
 |
| spatial requirements | 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
 |
| Tools | May include:* model of questions with known answers
* pilot program
* prototype dataset
* survey (staff in client organization
 |
| validity | May include:* 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
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* applying operational knowledge in a broad range of areas relating to linking datasets and knowledge management
* applying data security and backup measures
* applying a defined range of skills
* applying known solutions to a range of problems
* applying organizational skills and prioritizing activity
* applying solutions to a range of problems
* advising 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 substantial ranges of options is required
* creating a workable index system
* managing contingencies
* retrieving spatial data
* 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
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* 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
* organizational 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 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.
 |
| Underpinning Skills | Demonstrates skills to:* 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:
* analyze errors
* conduct image analysis
* perform mental calculations
* interpret and analyse statistics
* record with accuracy and precision
* undertake computations
* organizational skills to:
* coordinate technical and human resource inputs to research activities
* prioritize 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 a spatial 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
 |
| Resources Implication | 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
 |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Apply Principles of Hydraulics Pipe and Channel Flow** |
| **Unit Code** | **[EIS WSM 10 0217](#EIS_WSM_10_0217)** |
| **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. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1 Calculate energy losses in pipe flow. | 1.1 Review measurements and compare against expected trends.1.2 Use standard processes and software to check, edit, verify and audit data.1.3 Use standard processes to identify, estimate, adjust and justify data and review inconsistent data on flow conditions.1.4 Prepare records in a format suitable for dissemination. |
| 2 Calculate hydraulic and energy gradient for pipelines. | 2.1 Prepare pipeline design charts using standard formulae.2.2 Identify the limitations of formulae.2.3 Identify variations in roughness coefficients.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 methods used for measuring flows in open channels.3.2 Use the formulae for calculating flows in open channels.3.3 Distinguish the characteristics of open channels.3.4 Distinguish the uses of different measuring instruments and devices used in open channels3.5 Assess the hydraulic principles which apply to different meters.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 characteristics of notches and weirs.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. |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Standard processes and software | May include:* standards relevant to the monitoring network including ES 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
* WaterCAD
* SAP
* AutoCAD
* web-based development tools for presentation and reporting of data
 |
| Flow conditions | May 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 behavior under various flow conditions
 |
| Charts | May include:* Colebrook-White charts
* Hazen and Williams charts
* Manning charts
 |
| Roughness coefficients | May include:* biological growths and other obstructions
* slime deposits
* incrustations
* detritus
* 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 | May include:* container method
* tilt tank method
* trajectory method
 |
| Formulae for calculating flows | May include:* Cheesy equation
* Colebrook-White
* Hazen and Williams
* Darcy-Weisbach
* Manning equation
 |
| Characteristics of open channels | May include:* types of open channel
* steadiness
* uniformity
* state of open channel flow
* laminar, transitional and turbulent flow
* critical, subcritical and supercritical flow
 |
| Hydraulic principles | May include:* standards relevant to the monitoring network including ES  Measurement of water flow in open channels and ES Design Charts for water supply and sewerage for calculating pipe and channel flows
* 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-Poisseulle Equation
 |
| Characteristics of notches and weirs | May include:* type of the crest
* shape of the notch
* crest and conditions
 |
| Meters | May include:* mechanical meters such as:
* the displacement type
* the inferential type
* pressure meters such as:
* pitot tube
* orifice plate
* Venturi meter
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* 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
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* 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-Poisseulle equation
* Darcy-Weisbach equation
* Bernoullii'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
* 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
 |
| Underpinning Skills | Demonstrates skills to:* 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
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Develop and review wastewater treatment management plan** |
| **Unit Code** | **[EIS WSM5 11 0217](#EIS_WSM_11_1116)** |
| **Unit Descriptor** | This unit of competency describes the outcomes required to develop and monitor policies and plans for the treatment of wastewater. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1Plan and prepare for wastewater treatment**.** | 1.1 Identify and interpret wastewater treatment plant management requirements including legislative and enterprise policies.1.2 Access, review and interpret historic information relevant to the treatment of wastewater.1.3 Identify and interpret issues that impact on the treatment of wastewater.1.4 Identify and interpret stakeholder and customer requirements that impact on the discharge environment.1.5 Identify and interpret wastewater catchment impacts. |
| 2Develop a wastewater treatment management plan**.** | 2.1 Identify and interpret wastewater quality and quantity requirements according to legislative and enterprise requirements.2.2 Identify and assess environmental factors that impact on the treatment of wastewater.2.3 Identify and assess testing and monitoring processes and incorporate into the plan's development.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 wastewater treatment management plan. |
| 3Review and refine wastewater treatment management plan**.** | 3.1 Identify deviations from the management plan.3.2 Identify and evaluate system changes to meet the requirements of the treatment management plan.3.3 Identify and evaluate changes to the management plan required due to legislative, organizational, community and stakeholder requirements.3.4 Report and recommend changes to the management plan according to legislative and organizational requirements.3.5 Incorporate accepted recommendations into the updated and modified wastewater treatment management plan.3.6 Implement changes to the management plan. |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Legislative | May include:* relevant federal legislation
* relevant state or territory legislation
* relevant local government by-laws
* Ethiopian Standards
 |
| Customer | May include:* individual consumers
* regulators
* suppliers
* government
* community or specific enterprises
* industry
 |
| Environmental factors | 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 (e.g. floods, fires)
* industry activities and attitudes
* micro-organisms
* odor dispersion
 |
| Testing | May include:* physical analysis of wastewater:
* pH
* conductivity
* suspended solids
* chemical analysis of wastewater:
* chlorine
* nutrients
* chemical oxygen demand
* heavy metals
* microbiological analyses:
* coli forms
* 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
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* gathering, interpreting and synthesizing 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 organization'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
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* 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
 |
| Underpinning Skills | Demonstrates skills to:* 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
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Implement and manage water treatment processes monitoring program** |
| **Unit Code** | **[EIS WSM5 12 0217](#EIS_WSM_12_1116)** |
| **Unit Descriptor** | This unit of competency describes the outcomes required to implement and manage the treatment management plan for water treatment activities. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1 Implement and coordinate water treatment process monitoring program. | 1.1 Confirm performance measures for the water treatment management plan.1.2 Develop the implementation plan in conformance with legislation, organizational requirements and environmental factors.1.3 Design and implement the monitoring and testing programs according to the objectives of the water treatment management plan.1.4 Analyses, interpret and report testing results according to legislative and enterprise requirements.1.5 Identify and investigate problems and/or potential problems and report results and recommendations according to legislative and enterprise requirements.1.6 Store results and reports according to legislative and enterprise requirements. |
| 2 Monitor and optimize the process and production. | 2.1 Monitor treatment process resource usage according to the wastewater treatment management plan.2.2 Implement emergency action plans according to the wastewater 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 effluent/sludge customers and stakeholders 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 wastewater treatment management plan provisions with the results and/or recommendations reported and actioned according to legislative and enterprise requirements. |
| 3 Report on implementation and monitoring of the plan. | 3.1 Identify, investigate and report deviations from planned treatment parameters and quality and management plan requirements.3.2 Review objectives of the management plan.3.3 Make recommendations for changes to plan objectives and operational procedures. |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Legislation | May include:* relevant federal legislation
* relevant state or territory legislation
* relevant local government by-laws
* Australian Standards
 |
| Environmental factors | 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 (e.g. floods, fires)
* industry activities and attitudes
* micro-organisms
* odor 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:* physical analysis of wastewater:
* pH
* conductivity
* suspended solids
* chemical analysis of wastewater
* chlorine
* nutrients
* chemical oxygen demand
* Biological Oxygen Demand
* heavy metals
* microbiological analyses:
* coliforms
* plate counts
* algae identification and counts
* physical measures:
* power
* chemicals
* wastewater flows
* sludge volumes
* mechanical testing:
* vibration
* noise
* temperature
 |
| Customers | May include:* individual consumers
* regulators
* suppliers
* government
* community or specific enterprises
* industry
 |

|  |
| --- |
| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* 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
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* 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
 |
| Underpinning Skills | Demonstrates skills to:* 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
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Assessment Methods | Competence may be assessed through:* Interview / Written Test / Oral Questioning
* Observation / Demonstration
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation operation Level V** |
| **Unit Title**  | **Implement and Manage Potable Water Distribution System****Management Plan** |
| **Unit Code** | **[EIS WSM5 13 0217](#EIS_WSM5_13_0217)** |
| **Unit Descriptor** | This unit of competency describes the outcomes for theactivities associated with the implementation and managementof potable water distribution systems, including systemperformance analysis, customer liaison and planning. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1. **I**mplement

 Potable water  distribution  system management plan**.** | 1.1 Performance measures are confirmed for the potable water system management plan.1.2 ***Historic system*** ***information*** is accessed and interpreted to inform the implementation process.1.3 ***Stakeholders*** are informed and educated about the system management plan.1.4 Management plan components and activities are developed for implementation.1.5 The implementation plan is developed in conformance with ***legislation***, organisational and ***environmental requirements***.1.6 Responsibilities and timelines are determined for the implementation activities. |
| 2. Monitor andevaluate theoperation andmaintenanceof the system. | 2.1 ***Monitoring and testing*** procedures are planned, performed and reported to identify deviations of planned water system quantity, quality and pressure.2.2 Delivery of water is evaluated to customers (volume and pressure) and deviations are identified, investigated and reported from agreed service levels.2.3 Maintenance budgets, activity programs and output target measures are evaluated and deviations are identified, investigated and reported from target.2.4 Links between operational problems and maintenance activities are identified and recorded. |
| 3.Report on implementation of the plan | 3.1. Objectives of the management and implementation plans are reviewed.3.2 Recommendations are made for changes to plan objectives and operational and maintenance procedures. |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Historic systeminformation  | 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:* Customers
* government
* industries
* other water authorities
* power utilities
* employees
* customer representative committees
 |
| Environmentalrequirements  | May include:* risk assessment
* noise
* odors 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
* number of complaints
* burst mains
* leakages
* World Health Organization standards
* National Health and Medical Research Council (NHMRC)
* standards
* response time
* customer satisfaction
 |

|  |
| --- |
| **Evidence Guide** |
| Critical Aspects ofCompetence | The candidate should demonstrate the ability to:* Implement and manage 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
* test and monitor 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
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* 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
 |
| Underpinning Skills | Demonstrates skills to:* 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
 |
| Resources Implication | Demonstrates skills to:* 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
 |
| Methods of Assessment  | Competency may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competency may be assessed in the work place or in asimulated work place setting |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title**  | **Manage Project Quality** |
| **Unit Code** | **[EIS WSM5 14 0217](#EIS_WSM_14_1116)** |
| **Unit Descriptor** | This unit specifies the outcomes required to manage quality within projects. It covers determining quality requirements, implementing quality assurance processes, and using review and evaluation to make quality improvements in current and future projects. |

|  |  |
| --- | --- |
| **Elements** | **Performance Criteria** |
| 1. Determine quality requirements | 1. ***Quality objectives***, standards and levels are determined, with input from stakeholders and guidance of a higher project authority, to establish the basis for quality outcomes and a ***quality management plan***
2. Established ***quality management methods, techniques and tools***are selected and used to determine preferred mix of quality, capability, cost and time
3. Quality criteria are identified, agreed with a higher project authority and communicated to stakeholders to ensure clarity of understanding and achievement of quality and overall project objectives
4. Agreed quality requirements are included in the project plan and implemented as basis for performance measurement
 |
| 2. Implement quality assurance | 1. Results of project activities and product performance are measured and documented throughout the project life cycle to determine compliance with agreed quality standards
2. Causes of unsatisfactory results are identified, in consultation with the client, and appropriate actions are recommended to a higher project authority to enable continuous improvement in quality outcomes
3. Inspections of quality processes and ***quality control***results are conducted to determine compliance of quality standards to overall quality objectives
4. A quality management system is maintained to enable effective recording and communication of quality issues and outcomes to a higher project authority and stakeholders
 |
| 3. Implement project quality improvements | 1. Processes are reviewed and agreed changes implemented continually throughout the project life cycle to ensure continuous improvement to quality
2. Project outcomes are reviewed against performance criteria to determine the effectiveness of quality management processes and procedures
3. Lessons learned and recommended ***improvements*** are identified, documented and passed on to a higher project authority for application in future projects
 |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Quality objectives  | May include but not limited to:* requirements from the client and other stakeholders
* requirements from a higher project authority
* negotiated trade-offs between cost, schedule and performance
* those quality aspects which may impact on customer satisfaction
 |
| Quality managementplan  | May include but not limited to:* established processes
* authorizations and responsibilities for quality control
* quality assurance
* continuous improvement
 |
| Quality managementmethods, techniques andtools  | May include but not limited to:* brainstorming
* benchmarking
* charting processes
* ranking candidates
* defining control
* undertaking benefit/cost analysis
* processes that limit and/or indicate variation
* control charts
* flowcharts
* histograms
* pare to charts
* scatter gram
* run charts
 |
| Quality control  | May include but not limited to:* monitoring conformance with specifications
* recommending ways to eliminate causes of unsatisfactory
* performance of products or processes
* monitoring of regular inspections by internal or external agents
 |
| Improvements  | May include but not limited to:* formal practices, such as total quality management or continuous improvement
* improvement by less formal processes which enhance both the product quality and processes of the project, for example client surveys to determine client satisfaction with project team performance
 |

|  |
| --- |
| **Evidence Guide** |
| Critical Aspects of Competence | * A person who demonstrates competence in this unit must be able to provide evidence that they have taken responsibility for quality management of projects. This will include evidence of managing the work of others within the project team with respect to quality.
* documentation produced in managing projects such as:
* lists of quality objectives, standards, levels and measurement criteria
* records of inspections, recommended rectification actions and quality outcomes
* management of quality management system and quality management plans
* application of quality control, quality assurance and continuous improvement processes
* records of quality reviews
* lists of lessons learned and recommended improvements
* how quality requirements and outcomes were determined for projects
* how quality tools were selected for use in projects
* how team members were managed throughout projects with respect to quality within the project
* how quality was managed throughout projects
* how problems and issues with respect to quality and arising during projects were identified and addressed
* how projects were reviewed with respect to quality management
* how improvements to quality management of projects have been acted upon
 |
| Underpinning Knowledge and Attitudes | demonstrate knowledge of:* the principles of project quality management and their application
* acceptance of responsibilities for project quality management
* use of quality management systems and standards
* the place of quality management in the context of the project life cycle
* appropriate project quality management methodologies; and their capabilities, limitations, applicability and contribution to project outcomes
* attributes:
* analytical
* attention to detail
* able to maintain an overview
* communicative
* positive leadership
 |
| Underpinning Skills | Demonstrate skills of:* ability to relate to people from a range of social, cultural and ethnic backgrounds, and physical and mental abilities
* project management
* quality management
* planning and organizing
* communication and negotiation
* problem-solving
* leadership and personnel management
* monitoring and review skills
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title** | **Facilitate and Capitalize on Change and Innovation** |
| **Unit Code** | **[EIS WSM5 15 0217](#EIS_WSM_15_1116)** |
| **Unit Descriptor** | This unit specifies the outcomes required to plan and manage the introduction and facilitation of change; particular emphasis is on the development of creative and flexible approaches, and on managing emerging opportunities and challenges. |

|  |  |
| --- | --- |
| **Elements**  | **Performance Criteria**  |
| 1. Participate in planning the introduction and facilitation of change
 | * 1. Concept, nature importance and objective of change are understood.
	2. Steps tools and approaches of changes are planed and made in consultation with ***appropriate stakeholders***.
	3. The relationship among innovation, quality, change and cost is understood.
	4. Environments that facilitate the expedition of change are understood.
	5. ***Change resistance reducing techniques*** are identified and implemented.
 |
| 1. Manage growth and transition of business
 | * 1. ***Needs for growth*** are identified.
	2. ***Growth strategies*** are identified.
	3. Selected growth strategies are implemented.
 |
| 1. Develop creative and flexible approaches and solutions
 | * 1. Concepts, types and nature of problem are understood.
	2. Variety of problem solving techniques and approaches are identified and analyzed to manage workplace issues.
	3. ***Risks***are identified and assessed, and action initiated to manage these to achieve a recognized benefit or advantage to the organization.
	4. Workplace is managed in a way which promotes the development of innovative approaches and outcomes.
	5. Creative and responsive approaches to resource management are used to improve productivity and services, and/or reduce costs.
 |
| 1. Manage emerging challenges and opportunities
 | * 1. Future challenges and opportunities are identified in reference to global business situation
	2. The role of technology and its value additions are explained.
	3. Technology and innovation based system is introduced and implemented
	4. Individuals and teams are supported to respond effectively and efficiently to changes in the organization’s goals, plans and priorities.
	5. Coaching and mentoring are made to assist individuals and teams to develop competencies to handle change efficiently and effectively.
	6. Opportunities are identified and taken as appropriate to make adjustments and respond to the changing needs of customers and the organization.
	7. ***Information needs***of individuals and teams are anticipated and facilitated as part of change implementation and management.
	8. Recommendations are identified, evaluated and negotiated for improving the methods to manage change with appropriate individuals and groups.
 |

|  |  |
| --- | --- |
| **Variables** | **Range** |
| Appropriate stakeholders  | May include but not limited to:* Organization directors and other relevant managers
* Teams and individual employees who are both directly and indirectly involved in the proposed change
* Union/employee representatives or groups
* OHS committees
* Other people with specialist responsibilities
* External stakeholders where appropriate - such as clients, suppliers, industry associations, regulatory and licensing agencies
 |
| Change resistance reducing techniques | May include but not limited to:* Education and communication
* Participation and involvement
* Facilitation and support
* Negotiation and agreement
* Manipulation and cooptation
* Explicit and implicit coercion
 |
| Needs for growth | May include but not limited to:* Survival
* Economies of scale
* Expansion of market
* Owners mandate
* Technology
* Government policy
* Self sufficiency
 |
| Growth Strategies | May include but not limited to:* Franchising
* Outsourcing
* Sub-contracting
* Merging
 |
| Risks  | May include but not limited to:* Financial and non-financial risks
 |
| Information needs  | May include but not limited to:* New and emerging workplace issues
* Implications for current work roles and practices including training and development
* Changes relative to workplace legislation, such as OHS, workplace data such as productivity, inputs/outputs and future projections
* Planning documents
* Reports
* Market trend data
* Scenario plans
* Customer/competitor data
 |

|  |
| --- |
| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge to:* Participate in planning the introduction and facilitation of change
* Manage growth and transition of business
* Develop creative and flexible approaches and solutions
* Manage emerging challenges and opportunities
 |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge of:* Relevant legislation from all levels of government that affects business operation, especially in regard to occupational health and safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
* Growth strategies
* The principles and techniques involved in:
* Change and innovation management
* Development of strategies and procedures to implement and facilitate change and innovation
* Use of risk management strategies:
* Identifying hazards,
* Assessing risks and implementing risk control measures
* Problem identification and resolution
* Leadership and mentoring techniques
* Management of quality customer service delivery
* Consultation and communication techniques
* Record keeping and management methods
* The sources of change and how they impact
* Factors which lead/cause resistance to change
* Approaches to managing workplace issues
 |
| Underpinning Skills | Demonstrate skills on:* Communication skills
* Planning skills
* Managing risk
* Team work
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

|  |
| --- |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title** | **Establish and Conduct Business Relationships** |
| **Unit Code** | **[EIS WSM5 16 0217](#EIS_WSM_16_1116)** |
| **Unit Descriptor** | This unit covers the skills, attitudes and knowledge required to manage business relationship with customers. |

|  |  |
| --- | --- |
| **Elements**  | **Performance Criteria** |
| 1. Establish contact with customer
 | 1. Welcoming customer environment is maintained.
2. Customer is greeted warmly according to enterprise policies and procedures.
3. Effective service environment is created through verbal and non-verbal presentation according to enterprise policies and procedures.
4. Customer data is maintained to ensure database relevance and currency.
5. Information on customers and service history is gathered for analysis.
6. ***Opportunities*** to maintain regular contact with customers are identified and taken up.
 |
| 1. Clarify needs of customer
 | 1. Customer needs are determined through questioning and active listening.
2. Customer needs are accurately assessed against the products/services of the enterprise.
3. Customer details are documented clearly and accurately in required format.
4. Negotiations are conducted in a business-like and professional manner.
5. Maximize benefits for all parties in the negotiation through use of established ***negotiation techniques*** and in the context of establishing long term relationships.
6. The results of negotiations are communicated to appropriate colleagues and stakeholders within appropriate timeframes.
 |
| 1. Provide information and advice
 | 1. Features and benefits of products/services provided by the enterprise are described / recommended to meet customer needs.
2. Information is provided to satisfy customer needs.
3. Alternative sources of information/advice are discussed with the customer.
 |
| 1. Foster and maintain business relationships
 | 1. Pro-actively seek, review and act upon information needed to maintain sound business relationships.
2. Agreements are honored within the scope of individual responsibility.
3. Adjustments to agreements are made in consultation with the customer and share information with appropriate colleagues.
4. Nurture relationships through regular contact and use of effective interpersonal and communication styles.
 |

|  |  |
| --- | --- |
| **Variables** | **Range**  |
| Opportunities to maintainregular contact with customers  | may include:* informal social occasions
* industry functions
* association membership
* co-operative promotions
* program of regular telephone contact
 |
| Negotiation techniques | may include:* identification of goals, limits
* clarification of needs of all parties
* identifying points of agreement and points of difference
* preparatory research of facts
* active listening and questioning
* non-verbal communication techniques
* appropriate language
* bargaining
* developing options
* confirming agreements
* appropriate cultural behavior
 |

|  |
| --- |
| **Evidence Guide** |
| Critical Aspects of Competence | It is essential that competence is fully observed and there isability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of:* consistently applying enterprise policies and procedures and industry codes of practice in regard to customer service
* providing a quality service environment by treating customers in a courteous and professional manner through all stages of the procedure
* using effective questioning/active listening and observation skills to identify customer needs
* communicating effectively with others involved in or affected by the work
* maintaining relevant and current customer databases in accordance with enterprise policies and procedures
* ability to build and maintain relationships to achieve successful business outcomes
 |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge of:* Operational knowledge of enterprise policies and procedures in regard to:
	+ - customer service
		- dealing with difficult customers
		- maintenance of customer databases
		- allocated duties/responsibilities
		- General knowledge of the range of enterprise merchandise and services, location of telephone extensions and departments/sections
* Basic operational knowledge of legislation and statutory requirements, including consumer law, trade practices and fair trading legislation
* Basic operational knowledge of industry/workplace codes of practice in relation to customer service
* negotiation and communication techniques appropriate to negotiations that may be of significant commercial value
 |
| Underpinning Skills | Demonstrate skills of:* Use workplace technology related to use of customer database
* Collect, organize and understand information related to collating and analyzing customer information to identify needs
* Communicate ideas and information
* Plan and organize activities concerning information for database entries
* Use mathematical ideas and techniques to plan database cells and size
* Establish diagnostic processes which identify and recommend improvements to customer service
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |
| **Occupational Standard: Water Supply and sanitation Management Level V** |
| **Unit Title** | **Manage Continuous Improvement Process (Kaizen)** |
| **Unit Code** | **[EIS WSM5 17 0217](#EIS_WSM_17_1116)** |
| **Unit Descriptor** | This unit describes the performance, outcomes, knowledge, attitude and skills required to sustain and develop an environment in which continuous improvement, innovation and learning are promoted, rewarded and managed.  |

|  |  |
| --- | --- |
| **Elements** | **Performance criteria** |
| 1. Diagnose the current status.
 | 1. ***Parameters*** used for study current situation are obtained.
2. Internal and external environment is analyzed.
3. Problems related to targeted environment is recognized and identified.
4. Problems regarding to current situation are analyzed.
5. Alternatives are generated.
6. Best alternatives are selected.
 |
| 1. Design an effective continuous improvement process(kaizen).
 | 1. The values, mission and goals of kaizen management system are clarified.
2. The ***kaizen management template*** and a visual management logo full of purpose and meaning aredeveloped.
3. A clear action strategy (master and detailed plans) is defined.
4. The most effective and proven ***kaizen tools*** are chosen and applied.
5. A practical way is identified to involve all employees in ***Gemba activities*** (top, middle and bottom).
 |
| 1. Develop change capability.
 | 1. Kaizen Promotion Team Structure is developed.
2. The Kaizen Training Plan is defined and started.
3. Supervisors’ kaizen capability and habits are developed.
4. Key people are developed in terms of ***Individual leadership capability***.
 |
| 1. Implement improved processes.
 | 1. ***Sustainability/continuous improvement*** are promoted as an essential part of doing business.
2. Impacts of change and consequences are addressed for people, and transition plans implemented.
3. Objectives, time frames, measures and communication plans are ensured in place to manage implementation.
4. Contingency plans are implemented in the event of non-performance.
5. Failure is followed-up by prompt investigation and analysis of causes.
6. Emerging challenges and opportunities are managed effectively.
7. Continuous improvement systems and processes are evaluated regularly.
8. Improvements are communicated to all relevant groups and individuals.
9. Opportunities are explored for further development of value stream improvement processes.
 |
| 1. Establish direction and control.
 | 1. A ***system audit tool*** is defined and implemented.
2. The kaizen management system is deployed across all company levels and functions.
3. Results are checked and corrections made.
4. ***Standard operating procedures*** are developed and maintained.
5. The recruit, training and evaluation systems are improved and ***HR practices*** compensated.
 |

|  |  |
| --- | --- |
| **Variable** | **Range** |
| Parameters  | May include but not limited to:* Working condition
* Resources may include:
* Human
* Material
* Machine
* Kaizen elements
 |
| Kaizen management template  | May include but not limited to:* Visual management board for:
* displaying characteristic figures, data and graphics
* depicting and controlling processes
* identifying and marking sources of risks, setting and standards
* displaying company’s values and goals of kaizen
 |
| Kaizen tools  | May include but not limited to:* 5S (a visual workplace management)
* 7 QC tools( Cause and Effect Diagram, Check Sheet , Pareto Diagram , Histogram, Scatter Diagram, Control Chart and Flow Chart )
* Brainstorming
* Basic Industrial Engineering (IE) tools such as time study, motion study, line balancing, work sampling
* JIT(JUST IN TIME principles)
* MUDA identification and elimination tools
* Kanban
* Poka-yoke
* Takt- time
 |
| Gemba activities  | May include but not limited to:* Value-adding activities to satisfy the customer
* Employee autonomous operations (participating in team to identify nonconformity, propose solutions and implement them autonomously)
 |
| Individual leadership capability  | May include but not limited to:* Personal and interpersonal skills
* Courage
* Honour and integrity
* Energy and drive
* Strategic skills
* Operating skills
* Organizational positioning skills
 |
| Sustainability/continuous improvement  | May include but not limited to:* Improvements made by following PDCA (Plan, Do, Check and Act) cycle for:
* Improvements in one’s own work
* Saving in energy, material and other resources
* Improvements in the working environment
* Improvements in machines and processes
* Improvements in jigs and tools
* Improvement in office work
* Improvements in product quality
* Ideas for new products
* Customers services and customer relations
 |
| System audit tool | May include but not limited to:* 5S audit
* Patrol system
* Kaizen board
* 5M check lists
* Key Performance Indicators (KPIs)
 |
| Standard operating procedure  | May include but not limited to:* Administrative standards for:
* Managing the business
* Administration
* Personnel Guidelines
* Job Descriptions
* Guidelines for preparing cost information
* Operation standards for:
* Describing the way a job is done.
* Help realising Quality, cost, delivery.
* Addressing the need to satisfy customers.
* Using the process that’s the best.
* Producing work in the most cost effective manner.
* Assuring total quality for the customer.
 |
| HR practices  | May include but not limited to:* Resources may include:
* Recruit and retain high quality people with innovative skills and a good track, record in innovation
* HR development is used for:
* strategic capability and provide encouragement and facilities for enhancing innovating skills and enhancing the intellectual capital of the organization
* Reward will:
* Provide financial incentives and rewards and recognition for successful innovation
 |

|  |
| --- |
| **Evidence Guide** |
| Critical Aspects of Assessment | Demonstrates skills and knowledge competencies to:* Establish policy and cross-functional goals for kaizen
* Deploy and implement goals as directed through policy deployment and cross-functional management.
* Realize goals through deployment and audits.
* Build systems, procedures, and structures conducive to kaizen.
* Use kaizen in functional capabilities.
* Introduce Kaizen as a corporate strategy
* Provide support and direction between allocating resources
* Establish, maintain and upgrade standards.
* Make employees conscious through training programs.
* Assist employees develop skills and tools for problem solving.
 |
| Underpinning Knowledge and Attitude | Demonstrates knowledge of:* Quality management and continuous improvement theories
* creativity/innovation theories/concepts
* competitive systems and practices tools, including:
	+ 5S
	+ JUST IN Time (JIT)
	+ mistake proofing
	+ process mapping
	+ establishing customer pull
	+ setting of KPIs/metrics
	+ SOP
	+ Kaizen elements/targets.
	+ identification and elimination of waste/MUDA
	+ continuous improvement processes including implementation, monitoring and evaluation strategies for a whole organization and its value stream
	+ Difference between breakthrough improvement and continuous improvement
	+ organizational goals, processes and structure
	+ approval processes within organization
	+ methods of determining the impact of a change
	+ customer perception of value
	+ Define, Measure, Analyze, Improve and Control (DMAIC) to sustain process
 |
| Underpinning Skills | Demonstrates Skills to:* Use leadership skills to foster a commitment to quality and openness to improvement.
* Analyze training needs and implementing training programs
* Prepare and maintain quality and audit documentation
* Undertake self-directed problem solving and decision-making on issues of a broad and/or highly specialized nature and in highly varied and/or highly specialized contexts
* Communicate at all levels in the organization and to audiences of different levels of literacy and numeracy
* Analyze current state/situation of the organization.
* Analyze individually and collectively the implementation of competitive systems and practices tools in the organization and determining strategies for improved implementation
* Solve highly varied and highly specialized problems related to competitive systems and practices implementation and continuous improvement to root cause
* Negotiate with stakeholders, where required, to obtain information required for implementation and refinement of continuous improvements, including management, unions, employees and members of the community.
* Review relevant metrics, including all those measures which might be used to determine the performance of the improvement system, including:
* Key Performance Indicators (KPIs) for existing

 processes * Quality statistics
* Delivery timing and quantity statistics
* Process/equipment reliability (‘uptime’)
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* Interview / Written Test
* Observation / Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |