

Competency Standards for Caribbean Vocational Qualifications (CVQ)

CCBCG31305

Level III Draughting and Construction Technician Work

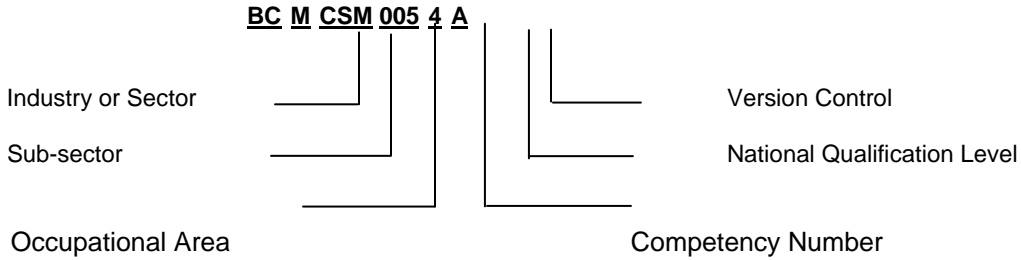
Unit Number	Unit Title	Mandatory /Elective	Hours
BCGCOR0031A	Draw and interpret simple drawings	Mandatory	20
ITICOR0011A	Carry out data entry and retrieval procedures	Mandatory	40
BCMFLS0023A	Plan, organise, control and evaluate work	Mandatory	15
BCMCOR0012A	Communicate information relating to work activities	Mandatory	25
ITIDAT1072A	Operate a spreadsheet application (Advanced)	Mandatory	20
ITIDAT1082A	Operate a word processing application (Advance)	Mandatory	20
BCGBCD0032A	Prepare construction drawing (intermediate)	Mandatory	80
BCGBCD0042A	Prepare 2D & 3D drawings using computer aided design (CAD) systems	Mandatory	120
BCGBCD0053A	Prepare drawings, specifications and schedules using computer aided design (CAD) systems	Mandatory	80
BCGBCD0063A	Produce working drawings for residential building	Mandatory	30
BCGBCD0083A	Apply mathematics to construction applications	Mandatory	20
BCGBCD0093A	Demonstrate knowledge of the science of materials and its applications	Mandatory	20
BCGBCD0103A	Apply knowledge of structural mechanics to construction applications	Mandatory	20
BCGBCD0113A	Apply construction technology and services	Mandatory	30
BCGBCD0123A	Apply knowledge of building designing, detailing and specification	Mandatory	20
BCGBCD0133A	Demonstrate knowledge of economic and legal influences of the construction industry	Mandatory	20
BCGBCD0143A	Apply electrical services technology	Mandatory	20
BCGBCD0153A	Demonstrate knowledge of mechanical services technology	Mandatory	20
BCGBCD0163A	Apply knowledge of planning the physical environment	Mandatory	20
BCGCDP0173A	Demonstrate knowledge of resource management	Mandatory	15
BCGBCD0183A	Develop civil engineering drawings	Mandatory	60
BCGBCD0193A	Apply knowledge of civil engineering constructions	Mandatory	30
BCGBCD0203A	Demonstrate knowledge of building services systems	Mandatory	20
BCGBCD0213A	Demonstrate knowledge of building services controls	Mandatory	20
BCGBCD0223A	Demonstrate knowledge of built environment and the community	Mandatory	20
BCGBCD0233A	Apply knowledge of cartography and measured surveys	Mandatory	30
BCGBCD0243A	Demonstrate knowledge of construction science for the internal environment	Mandatory	30
BCMBSV0014A	Apply building codes and standards to building	Mandatory	20
BCMFLS0033A	Lead the work of teams and individuals	Elective	10
BCMCSS0033A	Co-ordinate site storage and timekeeping operations	Elective	15
BCGMAS1613A	Carry out concrete slump test	Elective	10
BCGCSS0053A	Co-ordinate erection of formwork and temporary support structures	Elective	5
BCMCSS0073A	Co-ordinate the placement of concrete	Elective	10

To be awarded this Caribbean Vocational Qualification (CVQ) all core competency standards must be achieved. Electives achieved with the qualification will be awarded unit statement of competency.

The nominal training hours are a guide for planning the delivery of Training Programmes.

Legend to Unit Code

Example: BCMCSM0054A



KEY: **M**an – Mandatory; **BCD** – Building Construction Draughting; **CSS** – Construction Site Supervisor; **CSM** – Construction Site Manager; **FLM** – Front Line Management; **CPM** Construction Project Management; **FLS** – Front Line Supervision; **BSV** – Building Surveying; **BCT** – Building Contracting; **PFM** – Property and Facilities Management; **MGT** – Management; **SBM** – Small Business Management; **BSB** – Business Services (Business); **ITI** - Information Technology (Information)

BCGCOR0031A: Draw and interpret simple drawings

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively draw and interpret simple layout drawings and sketches, and applies to individuals working in the construction industry.

Competency Field:

General Construction

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1	Prepare for drawing	1.1	Drawing instruments and supplies are correctly identified and selected.
		1.2	Alphabet of lines is identified and applied with all lines distinct, easily read and of the appropriate line weight and type.
		1.3	Measurements are performed using appropriate scales.
		1.4	Lettering is constructed distinctly and is easily read.
2	Draw geometric constructions	2.1	The completed drawing illustrates a series of geometric shapes and activities.
		2.2	The finished drawing is neat and clear of smudges.
3	Construct multi-view (orthographic 2-D) drawing	3.1	The drawing illustrates three views of specified object with correct line representation.
		3.2	The finished multi-view drawing is constructed correctly.
4.	Develop a pictorial (3D) drawing	4.1	The drawing has a correct view orientation (isometric).
		4.2	The complete pictorial (3D) drawing is correctly developed with hidden features.
5	Construct and dimension drawings	5.1	All major features on the drawing are appropriately dimensioned to correct specification.
		5.2	All necessary details and information are shown.
6	Apply notes and leaders	6.1	The finished drawing is neatly and appropriately labelled.

		6.2	Completed drawing illustrates correct application of notes and leaders.
7	Prepare freehand sketch	7.1	Sketch correctly drawn with appropriate views where applicable.
		7.2	Necessary dimensions are shown and instructions and/or information conveyed by appropriate use of notes.
8	Interpret details from sketches and drawings	8.1	Components, assemblies or objects correctly identified.
		8.2	Commonly used symbols and abbreviations are recognised.
		8.3	Dimensions and instructions are identified and followed as required.
		8.4	Material requirements are correctly identified as required.

RANGE STATEMENTS

This unit applies to the preparation and interpretation of simple working drawings and sketches of building components or structures

Drawing instruments and supplies:

- drafting kit
- CAD workstation
- drafting paper
- drawings/modules/photographs

Alphabet of line:

- object line
- hidden line
- centre line
- section line
- dimension
- extension line
- cutting line
- short break line
- phantom line

Measurement systems:

- metres/centimetres
- metric(SI) system

Types of scale:

- architectural
- metric
- engineering
- civil

Geometric construction to include:

- circles
- regular polygons with four, six and eight sides
- pentagon inscribed within measured circle
- ellipse
- triangles with specified angles
- arcs thru three points; tangent to two circles

Multi-view (orthographic 2-D) drawings:

- full scale (1:1) orthographic 3-view drawing using third angle projection with top, front and right side view – show all hidden features and centrelines

Pictorial (3-D) drawing to include:

- isometric corner with left and right side lines each 30 degrees up from horizontal and third line at a vertical, with all three lines joining in a common intersection
- full scale (1:1) basic isometric drawing

Dimension drawings:

- dimensioning styles and methods: coordinate, linear/datum
- dimensioning 2-D drawing
- dimensioning complex shapes: spheres, cylinders, tapers, pyramids

EVIDENCE GUIDE

Competency is to be demonstrated by developing and effectively reading and interpreting simple drawings and sketches to locate or identify specified features or specifications in accordance with the performance criteria and the range listed within the range statement.

(1) Critical Aspects and Evidence

It is essential that competence is observed in the following aspects:

- identify and understand various types of drawings
- identify alphabet of lines, scales, lettering, dimensions, symbols, abbreviations and key features
- identify title panel and reference date of drawings

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- types and use of drawing instruments and supplies
- identification of alphabet of lines, line type variation, order of usage and application on drawings
- types of scale and proportion and how they are used for measurement
- symbols, dimensions and terminology
- types of drawings and their applications

Skills

The ability to:

- make simple freehand sketches
- prepare technical drawings with drawing instruments and with Auto CAD
- read and interpret sketches and working drawings
- measure accurately
- communicate effectively

(4) Resource Implications

The following resources should be made available:

- drawing instruments/CAD
- drawing supplies
- objects for drawing

(5) Method of Assessment

Competency may be assessed in a training institution under direct supervision with regular checks by the instructor.

Competency in this unit would be determined by an individual working alone or based upon integrated project work.

Assessment would be continuous by checking at the various stages of the job application in accordance with the performance criteria.

The candidate will have access to drawing instrument, equipment, materials and documentation required

(6) Context of Assessment

Competency should be assessed in a classroom environment in accordance with work practices and safety procedures.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

ITICOR0011A: Carry out data entry and retrieval procedures

Competency Descriptor:

This unit deals with the skills and knowledge required to operate computer to enter, manipulate and retrieve data and to access information and communicate via the Internet.

Competency Field: Information Technology and Communications - Operations

ELEMENT OF COMPETENCY PERFORMANCE CRITERIA

1. Initiate computer system	1.1	Equipment and work environment are correctly checked for readiness to perform scheduled tasks.
	1.2	The hardware components of the computer and their functions are correctly identified.
	1.3	Equipment is powered up correctly.
	1.4	Access codes are correctly applied.
	1.5	Appropriate software is selected or loaded from the menu.
2. Enter data	2.1	Types of data for entry correctly identified and collected.
	2.2	Input devices selected and used are appropriate for the intended operations.
	2.3	Manipulative procedures of Input device conform to established practices.
	2.4	Keyboard/mouse is operated within the designated speed and accuracy requirements.
	2.5	Computer files are correctly located or new files are created, named and saved.
	2.6	Data is accurately entered in the appropriate files using specified procedure and format.
	2.7	Data entered is validated in accordance with specified procedures.
	2.8	Anomalous results are corrected or reported in accordance with specified procedures.
	2.9	Back-up made in accordance with operating procedures.

- 3. Retrieve data
 - 3.1 The identity and source of information is established.
 - 3.2 Authority to access data is obtained where required.
 - 3.3 Files and data are correctly located and accessed.
 - 3.4 Integrity and confidentiality of data are maintained.
 - 3.5 The relevant reports or information retrieved using approved procedure.
 - 3.6 Formats to retrieved report or information conform to that required.
 - 3.7 Copy of the data is printed where required.
- 4. Amend data
 - 4.1 Source of data/information for amendment is established.
 - 4.2 Data to be amended is correctly located within the file.
 - 4.3 The correct data/Information is entered, changed or deleted using appropriate input device and approved procedures.
 - 4.4 The Integrity of data is maintained.
- 5. Use document layout and data format facilities
 - 5.1 Requirements for document are verified where necessary.
 - 5.2 The given format and layout are appropriately applied.
 - 5.3 Facilities to achieve the desired format and layout are correctly identified, accessed and used.
 - 5.4 Data manipulating facilities are used correctly.
 - 5.5 Format reflects accuracy and completeness.
- 6. Monitor the operation of equipment
 - 6.1 The system is monitored to ensure correct operation of tasks.
 - 6.2 Routine system messages are promptly and correctly dealt with.
 - 6.3 Non-routine messages are promptly referred in accordance with operating requirements.

	6.4	Error conditions within level of authority are dealt with promptly, and uncorrected errors are promptly reported.
	6.5	Output devices and materials are monitored for quality.
7. Access and transmit information via the Internet	7.1	Access to the Internet is gained in accordance with the provider's operating procedures.
	7.2	Evidence of the ability to negotiate web sites to locate and access specified information and other services is efficiently demonstrated.
	7.3	E-Mail is sent and retrieved competently.
8. Close down computer system	8.1	The correct shut down sequence is followed.
	8.2	Problem with shutting down computer is reported promptly.
	8.3	All safety and protective procedures are observed.
	8.4	The system integrity and security are preserved.
9. Maintain computer equipment	9.1	Cleaning materials and/or solutions used meet specified recommendation.
	9.2	The equipment is cleaned as directed.
	9.3	Wear and faults identified are promptly reported to the appropriate personnel.

RANGE STATEMENT

This unit applies to activities associated with essential operations linked to using and maintaining basic computer equipment.

Equipment:

- install supplied computer
- install supplied peripherals

Work environment:

- equipment
- furniture
- cabling
- power supply

Input devices:

- keyboard
- mouse
- scanner
- microphone
- camera

Software systems to include for:

- word processing
- spread sheet
- internet access

Files save on:

- network
- magnetic media
- personal PC

Data:

- textual
- numerical
- graphical

File operations:

Naming, updating, archiving, traversing field and records in database, use of search, sort, print

Maintenance:

- cleaning: enclosures, screen, input devices, output devices
- checking cables, etc

EVIDENCE GUIDE

Competency is to be demonstrated by the ability to accurately carry out basic data entry and retrieval operations on a computer system in accordance with the performance criteria and the range listed within the range of variables statement.

(1) Critical Aspects and Evidence

It is essential that competence be observed in the following aspects:

- Initiate the use on the equipment.
- Use document layout and data format facilities.
- Locate and access data.
- Use file operations.
- Manipulate input devices.
- Key-in and format reports.
- Access to the internet.

(2) Pre-requisite Relationship of Units

The pre-requisite for this unit is:

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

knowledge of:

- safety for working with and around computers
- computer hardware and software systems
- procedure for initiating and closing down computer
- the operation of the data entry management system
- methods of locating files
- organisation's standards applicable to accessing files
- files operations and their applications
- file operation in database setting
- creating, locating and saving files
- using input devices
- using data checking devices
- formatting functions of software
- layout function of software
- graphic productions and manipulation
- regard for accuracy and security of information
- functions on the internet

Skills

The ability to:

- identify computer hardware
- manipulate data input devices
- access data
- use file operations
- key-in and format reports and letters
- retrieve data
- amend data
- print data
- save data
- search and receive data from the internet
- send and receive E-Mail

(4) Resource Implications

Files saved on network, magnetic media, personal Computer

Input devices: Keyboard, mouse, other selection devices

(5) Method of Assessment

Competency shall be assessed while work is undertaken under direct supervision with regular checks, but may include some autonomy when working as part of a team.

Competencies in this unit may be determined concurrently. Assessment must be in accordance with the performance criteria.

(6) Context of Assessment

This unit may be assessed on or off the job. Assessment should include practical demonstration either in the workplace or through a simulation. A range of methods to assess underpinning knowledge should support this

CRITICAL EMPLOYABILITY SKILLS

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Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level -	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level -	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCMFLS0023A: Plan, organise, control and evaluate work

Competency Descriptor:

This unit deals with the skills and knowledge required to carry out activities relating to the planning, organising, controlling and evaluation of work on the construction site.

Competency Field: Construction Frontline Management

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Plan work activities and methods	1.1	Contributions made to the setting and updating of organisation's work objectives are clear and accurate.
		1.2	Planned work methods are consistent with management priorities and objectives, legal requirements and working conditions.
		1.3	Plans make cost effective use of available resources within given constraints.
		1.4	Advice is sought from the relevant personnel where legal or statutory requirements and objectives appear to conflict.
		1.5	Views of others are sought in a manner, which encourages individuals to offer suggestions.
		1.6	Work activities are designed to ensure that organisational objectives are achieved.
2.	Plan for the use of resources	2.1	Valid and relevant information on resources is obtained and/or given to appropriate personnel.
		2.2	Important trends and changes in resource usage are identified and suggested to the relevant personnel.
		2.3	Recommendations and plans from the use of resources indicate the benefits, which should be achieved.
		2.4	Plans take account of known factors likely to affect the use of resource.
		2.5	Plan conforms to organisational and statutory policy and requirements.
		2.6	Feedback on plans is communicated as appropriate to the relevant personnel.

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| 3. Monitor and control the use of resources | 3.1 | Information on the use of resources is correctly interpreted and communicated to the appropriate personnel. |
| | 3.2 | Individual responsibility for the use of resources is communicated effectively. |
| | 3.3 | Resources are used in accordance with organisational specifications and guidelines. |
| | 3.4 | Recommendations for improving the use of resources are passed on to the relevant people as appropriate. |
| | 3.5 | Records of the use of resources are complete, accurate and legible, and in accordance with organisational requirements. |
| | 3.6 | Systems and procedures for monitoring and maintaining resources are observed. |
| | 3.7 | Prompt corrective action is taken in response to significant deviations from planned use of resources. |
| 4. Organise work and assist in the evaluation of work | 4.1 | Work is organized to make effective use of resources and to meet objectives, plan and other requirements. |
| | 4.2 | Responsibilities and limits of authority of team and individual are communicated to the relevant people. |
| | 4.3 | Standards of performance are clearly defined and communicated to the relevant person. |
| | 4.4 | People are encouraged to seek clarification of their allocated activities. |
| | 4.5 | The degree of guidance required by individuals is assessed and used to best effect in organizing work. |
| | 4.6 | The information/instruction given is appropriate to the importance and scale of work allocated and evaluated. |
| | 4.7 | The work of individuals and teams is evaluated against quality standards and resources applied. |
| | 4.8 | Results of evaluations are relayed to appropriate people. |
| | 4.9 | Action is taken to minimize the impact on resources of inappropriate work methods or changes to organizational demands. |

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| 5. | Provide feedback on work performance to teams and individuals | 5.1 | Feedback is given in sufficient detail and in a manner appropriate to the individuals and/or team. |
| | | 5.2 | Feedback is given at a time and place conducive to its reception. |
| | | 5.3 | Constructive suggestions and encouragement for improving future performance are given. |
| | | 5.4 | Feedback recognises performance and achievement. |
| | | 5.5 | Details of any action to be taken and a timetable are accurately recorded. |
| | | 5.6 | People are encouraged and assisted to make suggestions on how system/procedures could be improved. |
| | | 5.7 | Opportunities to discuss feedback are readily available. |
| | | 5.8 | Proper work attitudes are appropriately displayed. |
| | | 5.9 | Evidence of lead-role is demonstrated in providing technical directives and supervision to work team (s) |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

People to be consulted and informed:

- those for whom one has responsibility
- colleagues
- site managers
- suppliers
- customers
- staff representatives
- sub-contractors
- government representatives

Objectives:

- short-term
- long term
- personal
- organisational

Contributions:

- written
- oral
- formal
- informal

Requirements for planning:

- health, hygiene and safety legislation
- employment legislation
- building and construction regulations
- resources availability

Resources:

- financial
- manpower
- information
- machines and equipment
- materials
- services
- time

Constraints:

- plans
- staff availability
- workload commitment
- equipment availability
- cost
- weather condition
- finance

Feedback is given:

- at appraisals/performance reviews
- as required to maintain motivation, morale, effectiveness
- to support learning/development
- in response to requests from colleagues and for those for whom one has responsibilities
- when possible, after any given task
- at team meetings
- at introduction of new services

Recommendations take account of:

- health, hygiene and safety issues
- employment agreement
- building and construction regulations
- equipment requirements
- organisational policies
- plans and procedures
- customer requirements

Communications:

- formal/informal
- written/oral
- electronic
- practical demonstration
- drawing/diagrams

Feedback is provided:

- verbally
- in writing
- through the allocation of work in accordance with performance

Suggestions for improvements include:

- advice
- counselling
- training/development
- re-assignment
- instruction
- delegation secondary
- coaching/mentoring
- through disciplinary procedures
- constructive criticism

Recognition is in the form of:

- praise
- warning/criticism
- recommendations for promotion/jobs changes
- counselling
- incentives/rewards
- certificates of achievement

Evidence of lead role include:

- mentoring
- instructing
- coaching
- promoting

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Performance Criteria and Range Statement.

(1) Critical Aspects of Evidence

- Compliance with occupational health and safety regulations applicable to workplace operations.
- Application of organisational management policies and procedures including quality assurance requirements where applicable.
- Demonstrated ability to provide contribution to planning work activities and methods.
- Co-ordinate the maintenance of safe and effective conditions at the work environment.
- Identify, select and plan for and monitor the use of resources.
- Demonstrated ability to evaluate work performance and provide appropriate feedback.

(2) Pre-requisite Relationship of Units

Pre-requisite for this unit is:

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- principles and methods relating to setting and reviewing objectives and performance measures
- work objectives, plans, schedules and time scales
- analysing the use of resources, risks and contingencies and acting upon the outcome of these analyses
- applying relevant items of legislation to actual/typical circumstances
- forming and managing work groups and teams
- data relating to work objectives and relating performance measures
- principle risks and contingent factors affecting objectives
- acceptable work methods
- resources available and capacity for the delivery of objectives
- constraints affecting the delivery of objectives
- customers requirements
- key features of relevant legislation
- principles and methods relating to monitoring work movement and identify operational charges
- responsibilities of individuals
- performances of teams and individuals during previous work allocations
- security measures for control equipment
- assessment of inclement weather and the consequences

Knowledge

Knowledge of:

- dealing with accidents and emergencies
- procedures for recording information
- operational changes
- organizational procedures
- accidents and emergency records
- principles and methods relating to motivating staff to each work objectives through encouraging participation in setting them
- using different styles of direction and supervision
- Identifying and assessing the competences of teams and individuals
- learning and skill developing
- establishing, defining and reviewing objectives and performance measures

Skills

The ability to:

- read and interpret technical document
- identify and set work priorities
- report writing
- implementing safety awareness programmes
- oral and written communication
- identifying hazards
- decision making

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment. If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- a real or simulated environment
- project resources
- organisation policies and guidelines
- access to relevant resource personnel
- relevant legal and statutory documentation

(5) Method of Assessment

Assessment against this unit may involve the following:

Continuous assessment in a setting that stimulate the conditions of performance described in the elements, performance criteria and range statements that make up this unit

Continuous assessment in the workplace, taking into account the range on variables affecting performance.

Self-assessment on the same terms as those described above.

Simulated assessment or critical incident assessment, provided that the critical incident involves assessment against performance criteria and an evaluation of underpinning knowledge and skill required to achieve the required performance outcomes.

(6) Context of Assessment

For valid and reliable assessment of this unit, the competency should be demonstrated over a period of time and observed by the assessor.

The competency is to be demonstrated in a range of situations, which may include involvement in related activities normally experienced in the workplace.

Evidence of underpinning knowledge understanding of processes and principles can be gained through thorough questioning and by observation of previous work.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCMCOR0012A: Communicate information relating to work activities

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively communicate information and instructions relating to work operation and activities.

Competency Field: Construction Site Management – Frontline Supervision

ELEMENT OF COMPETENCY PERFORMANCE CRITERIA

1. Request and provide work instructions and information	1.1	The ability to ask for and provide work information using appropriate language strategies is demonstrated.
	1.2	The ability to communicate effectively at work using appropriate method, language and idiom is demonstrated.
	1.3	Sufficiency in fluency, emphasis and pace of delivery in expressing meaning clearly is demonstrated.
	1.4	Specialist work-related terminologies are used appropriately.
	1.5	Complex technical issues are discussed using clear and accurate language.
	1.6	The ability to use a range of language strategies to clarify understanding when receivers do not understand is demonstrated.
	1.7	The ability to ask for clarification promptly and politely when what was said was not understood.
	1.8	Standard reference materials were used to extend range of phrases and structures.
	1.9	The ability to evaluate own language performance is demonstrated.
2. Present and respond to differing lines of reasoning	2.1	The ability to present, evaluate and respond to differing lines of reasoning/argument using appropriate language strategies is demonstrated.
	2.2	The ability to hold an effective discussion about work using appropriate language and idiom is demonstrated.

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| | 2.3 | Sufficient fluency, emphasis and pace of delivery used when expressing meaning clearly. |
| | 2.4 | The correct use of specialist and work-related terminology is appropriately demonstrated. |
| | 2.5 | The ability to express meaning clearly when presenting lines of argument is correctly demonstrated. |
| | 2.6 | The ability to identify, compare and contrast the key points in other people's arguments and use them to formulate own response is correctly demonstrated. |
| | 2.7 | The ability to formulate own response clearly is demonstrated. |
| | 2.8 | A range of language strategies is used to clarify understanding when receivers do not understand. |
| | 2.9 | Clarification is promptly and politely asked for when the individual understanding is in doubt. |
| 3. | Contribute to work-related meetings and discussions | 3.1 The ability to participate in spontaneous discussions about your work appropriately demonstrated. |
| | | 3.2 The ability to appropriately communicate effectively to the agenda of meetings is demonstrated. |
| | | 3.3 Meanings are clearly expressed with sufficient fluency, emphasis and pace of deliver. |
| | | 3.4 Contributions to meetings are done without getting off the point of discussion. |
| | | 3.5 Complex issues are discussed using clear and accurate language. |
| | | 3.6 The key points of other people's contributions are identified and used to formulate own response. |
| | | 3.7 Appropriate language strategies are used to clarify understanding for the receivers. |
| 4. | Deliver prepared presentation | 4.1 Preparation for presentation ensures that the language is appropriate to the subject matter and the occasion. |
| | | 4.2 Presentation is presented according to the organisation's requirements and adjusted to meet audience needs. |

- | | |
|----------------------------|--|
| 4.3 | Presentation is clear, logical and sequential; delivered within time specified and utilise, where needed, appropriate media. |
| 4.4 | The ability to respond to questions and comments following the presentation is correctly demonstrated. |
| 4.5 | Differences of opinion are respected and considered in a way that encourages other's contributions. |
| 4.6 | Appropriate strategies are used to clarify meaning when people have not understood. |
| 4.7 | The ability to evaluate own language performance is appropriately demonstrated. |
| 5. Produce written reports | 5.1 Reports are written using appropriate terminology where required. |
| | 5.2 Reports are coherent and based on observation/investigation undertaken. |
| | 5.3 Conclusions are based on facts in the report and recommendations are made if required. |
| | 5.4 Reports are completed within specified time. |
| | 5.5 References are acknowledged as required. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Portfolio evidence should include at least one topic of the six categories:

- information and advice about technical aspects of your work
- proposals for development and action
- non-complex operating instructions
- complex operating instructions
- progress reports
- organizing and planning work

Communicating to:

- people familiar with the subject and know the candidate
- people not familiar with the subject and do not know the candidate

Communication methods:

- verbal – face to face, telephone
- written – paper based, electronic

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Performance Criteria and Range Statement.

(1) Critical Aspects of Evidence

- use of a variety of complex idioms and expressions
- recognising and adopting to different levels of formality including colloquial
- produce most of the technical vocabulary relevant to the workplace
- demonstrated ability to respond to a wide range of spontaneous interactions
- participation in meetings and discussions
- make representation on behalf of immediate manager
- provisions for facilitating team discussions
- investigation and preparation of written reports
- relate to people from varied social, cultural and ethnic background
- evidence is best gathered through a holistic assessment activity, which integrates the elements of competency

(2) Pre-requisite Relationship of Units

Pre-requisite for this unit is:

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- all aspects of the syntax and grammar of language
- a wide range of phrases
- specialist vocabulary in own area of expertise
- slang and colloquialisms used at work and socially
- conventions of adapting language to the situation and the people present
- assessment of cultural communication protocol
- interviewing techniques

Skills

The ability to:

- take part in discussion
- produce complex written materials
- use images
- read and respond to written materials

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment. If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- access to appropriate workplace where assessment can take place or
- simulation of realistic workplace setting for assessment

(5) Method of Assessment

Assessment against this unit may involve the following:

Assessment may include observations, questioning or evidence gathered from the workplace, including testimonials from clients and colleagues, etc.

It is recommended that assessment be conducted over more than occasion and include communications with individuals and groups.

(6) Context of Assessment

For valid and reliable assessment of this unit, the competency should be demonstrated over a period of time and observed by the assessor.

This unit of Competence will be most appropriately assessed in the workplace or in a simulate environment and under the normal range of workplace condition

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> • Carries out established processes • Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> • Manages process • Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> • Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

ITIDAT1072A: Operate a spreadsheet application (advanced)

Competency Descriptor:

This unit deals with the skills and knowledge required to perform operations using advance features of a spreadsheet application and applies to individuals operating in the information and communication industry.

Competency Field: Information Technology

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Create spreadsheets	1.1	Basic built-in functions are appropriately employed.
		1.2	Appropriate formulae are entered using relative and absolute referencing where required.
		1.3	Formulae are promptly corrected when standard error messages occur.
		1.4	Various tools are used appropriately during spreadsheet development.
		1.5	Data entries are copied or increased incrementally for logical and clear presentation of information.
2.	Customise spreadsheet environment	2.1	Page display modes, orientation and size are appropriately adjusted to meet user requirements and/or special needs.
		2.2	Toolbar is appropriately modified to meet user and document uses.
3.	Format spreadsheet	3.1	Selected format is correctly copied from another cell or group of cells in the spreadsheet or from another active spreadsheet.
		3.2	Appropriate formatting tools are used as required within the spreadsheet and/or individual cells.
		3.3	The ability to identify, set, edit and test basic and conditional cell validations is demonstrated.
		3.4	Message boxes are created.
		3.5	Headers and footers are inserted and all the necessary information and formatting styles are incorporated into the headers and footers using the correct procedures.

		3.6	Document is saved in another format and in a format that is appropriate for posting to a web site.
4.	Incorporate objects and charts in spreadsheets	4.1	Objects are imported to and manipulated within a spreadsheet using the correct procedures.
		4.2	Spreadsheet data is clearly displayed in different charts.
		4.3	Charts are appropriately modified for formatting purposes.
5.	Sort and Lookup Records	5.1	Basic and advanced sorting options are used.
		5.2	Lookup functions to return values from search table are used.
		5.3	Scenarios are created and worked with.
6.	Create nested functions and macros	6.1	Nested functions are created, edited and copied.
		6.2	Macros are created, edited and executed.

RANGE STATEMENT

This unit applies to the activities associated with the essential operations linked to the operations of advance features of spreadsheet applications and applies to individuals in the information and communication industry.

Hardware may include but not limited to:

- personal computer
- networked system
- printer

Software may include but not limited to:

- Microsoft Excel
- Lotus 123

Formatting may include:

- margins
- indentations
- page layout
- orientation

Mathematical formulae may include:

- average
- interest
- multiply
- divide

Data may include:

- numeral
- text
- images
- objects

EVIDENCE GUIDE

Competency is to be demonstrated by the ability to complete basic operations associated with the advanced features of a spreadsheet application in accordance with the performance criteria and the range listed within the range of variable statements.

(1) Critical Aspects of Evidence

It is essential that competence is observed in the following aspects:

- creating spread sheets
- insertion of correct data
- use appropriate formulae
- formatting and modifications done to specifications
- create nested functions and macros
- correct interpretation of job specifications

(2) Pre-requisite Relationship of Units

Pre-requisites for this unit are:

- ITICOR0231A Operate a personal computer

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- basic technical terminology in relation to reading help files and prompts
- log-in procedures relating to accessing a PC
- types of software
- basic mathematics
- formatting functions of software
- nested functions and macros

Skills

The ability to:

- create spreadsheets
- format and modify worksheets
- apply mathematical formulae
- customise settings

(4) Resource Implications

The following resources should be provided:

- actual workplace or simulated environment
- personal computer/network
- printer

(5) Method of Assessment

Competency shall be assessed while work is undertaken under direct supervision with regular checks, but may include some autonomy when working as part of a team.

Competencies in this unit may be determined concurrently. Assessment must be in accordance with the performance criteria.

(6) Context of Assessment

This unit may be assessed on or off the job. Assessment should include practical demonstration either in the workplace or through a simulation. A range of methods to assess underpinning knowledge should support this.

Simulated activities must closely reflect the workplace.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level -	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

ITIDAT1082A: Operate a word processing application (advance)

Competency Descriptor:

This unit deals with the skills and knowledge required to operate a word processing application and applies to individuals operating in the information and communication industry.

Competency Field: Information Technology

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Insert, format and protect form elements	1.1 A rough sketch of the form to be created is drawn on a paper. 1.2 The form fields required to gather information are determined. 1.3 The desktop environment is customized to include forms toolbar. 1.4 Form fields are inserted and their properties set. 1.5 Form fields are checked to conform that they are long enough to handle input from the user. 1.6 The form fields are formatted and styled as required. 1.7 Forms and fields are protected/unprotected.
2. Create tables for forms	2.1 Tables are created for alignment of fields or to control row height. 2.2 Form fields are placed in table cells. 2.3 Table cells are formatted as required.
3. Create and work with a long document	3.1 A general outline is decided and work is divided into sections or chapters with headings and sub-headings. 3.2 Templates are created and styles applied on headings to consider how the final version will be bound. 3.3 Document maps are used to move quickly around the document.

- 3.4 Sections are created in documents when certain parts of the documents are required to be formatted differently from the other parts of the document.
- 3.5 Different headers and footers are added to different pages within the document as required.
- 3.6 Table of contents are applied as required.
- 4. Create macros and run macros
 - 4.1 Macros are recorded as required.
 - 4.2 Macros are run and edited as required.
 - 4.3 Macros are added to the toolbar.

RANGE STATEMENT

This unit applies to the activities associated with the essential operations linked to advance operations of a word processing application and applies to all individuals in the information and communication industry.

Software may include but are not limited to:

- Microsoft Word
- Microsoft Works
- Corel WordPerfect

Equipment may include:

- personal computer
- printer

Formatting may include:

- page orientation
- margins
- enhancements to text –colour, font, size
- enhancements to format – borders, patterns and colour
- alignment on page

EVIDENCE GUIDE

Competency is to be demonstrated by the ability to complete basic operations associated with creating and formatting forms, long documents and macros in accordance with the performance criteria and the range listed within the range of variable statements.

(1) Critical Aspects of Evidence

It is essential that competence is observed in the following aspects:

- create documents in line with organisation's guidelines
- customise settings
- format and layout document to specification
- insert form elements
- use software features and tools appropriately
- create and run macros

(2) Pre-requisite Relationship of Units

ITICOR0231A Operate a personal computer

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- operating systems software and software tools
- applications and their features
- form fields and their properties
- use of document maps
- macros and templates

Skills

The ability to:

- create form elements
- customise settings
- create tables and templates
- work with long documents
- format and style documents

(4) Resource Implications

The following resources should be provided:

- work environment (simulated or actual enterprise)
- personal computer/network
- printer

(5) Method of Assessment

Competency shall be assessed while work is undertaken under direct supervision with regular checks, but may include some autonomy when working as part of a team.

Competencies in this unit may be determined concurrently. Assessment must be in accordance with the performance criteria.

(6) Context of Assessment

This unit may be assessed on or off the job. Assessment should include practical demonstration either in the workplace or through a simulation. A range of methods to assess underpinning knowledge should support this.

Simulated activities must closely reflect the workplace.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level -	
Use mathematical ideas and techniques	Level -	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

**BCGBCD0032A****Prepare Construction drawing (intermediate)**

Competency Descriptor:

The unit deals with the skills, knowledge and attributes required for demonstrating the use of media, draughting techniques and presentation in producing construction drawings, measuring and recording the physical details of a building interior and producing drawings of the fitting – out of part of a building.

Competency Field: Building & Construction General – Building Drawings

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Demonstrate the use of media, draughting techniques and presentation in producing construction drawings	1.1 Criteria for the selection of media and materials, scales, symbols and conventions for typical construction drawings are identified.
	1.2 Suitable media and materials, scales, symbols and conventions for typical construction drawings are selected.
	1.3 Drawing methods to provide construction information are carried out.
2. Measures and record the physical details of a building interior	2.1 A linear survey of a building interior is carried out using appropriate equipment and techniques.
	2.2 Information derived from the survey is recorded using freehand sketches and notes.
	2.3 Annotated sketches to scale are produced for the building interior using conventional drawing format.
3. Produce drawings of the fitting - out of part of a building interior	3.1 Sketches are produced to establish the location of fittings for an enclosure of specified purpose.
	3.2 Drawings using Royal Institute of British Architect (RIBA) preferred scales and British Standard symbols are produced to distinguish fittings and services requirements.
	3.3 Drawings showing accurate text and dimension are produced and copied.
	3.4 Conventions of presentation are demonstrated so that others can use the drawings.



RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency, allowing for differences between institutions and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to the preparation and interpretation of working drawings and sketches of building components or structures.

Typical construction drawings:

- sketches (e.g. plans, elevations, isometric projections, axonometric projections)
- formal scaled drawings (e.g. general arrangements, layouts, plan, sections, elevations)

Criteria for selection:

- usage
- ease of copying
- suitability for modification
- suitable for end-user

Media and materials:

- isometric graph pads
- normal graph pads
- cartridge paper
- tracing paper
- drawing film
- pencil of 2B to 3H density
- clutch pencils of 2B to 3H density
- pens
- ink
- compasses
- set squares

Scales, symbols and convention:

- Royal Institute of British Architect (RIBA) preferred scales
- British standards
- Codes of practice

Drawing methods:

- sketching
- isometric projections
- axonometric projections
- plans
- elevations
- sections
- perspectives

Construction information:

- scale drawing of work to be done/ working drawing
- sketches for modifications on site
- assembly drawings
- outline drawings
- schedules of components
- statistical data

Drawings:

- size (A2, A3, A4)
- drawing paper (e.g. tracing, detail, cartridge)
- pens (e.g. lining, technical)

Copied:

- dyeline
- photographing

**Building interior:**

- one floor
- an enclosure not exceeding 7.5m by 9m
- change of direction
- partitions
- walls
- door opening
- window opening
- stairwells

Information:

- dimensions (plan dimensions, locations of openings, location of fixtures, vertical dimensions, window openings, fixtures, sizes of any fittings)
- other features (e.g. location of service runs, ducts, floor thicknesses, wall thicknesses, identifying load bearings walls)

Drawing format:

- plans
- sections
- evaluations

Fittings for enclosure:

- cooking area (kitchen units sink, washing machine)
- bedroom and ensuite shower room (wardrobes base, units, washbasin, shower)
- study (shelving, base cupboards, desk, heating, ventilation, personal computer)

Conventions of presentation:

- title blocks
- note columns
- choice of projection
- schedule of fittings
- drawings (plans, evaluations, cross section, special details)

Equipment:

- fibre of steel tapes
- measuring rods
- graph pads
- electronic note pad
- paper note pad

Specified purpose for enclosure:

- cooking area (e.g. kitchen units, sink washing machine)
- bedroom and ensuite shower room study

Techniques:

- running linear dimensions
- use of diagonal dimensions from internal corners as checks

Service requirements:

- hot water supply
- cold water supply
- electrical lighting and power circuits
- gas supply



EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Performance Criteria and Range Statement

(1) Critical Aspects and Evidence

It is essential that competence be observed in the following aspects:

- demonstrated ability to apply basic computer skills and safety techniques
- demonstrated ability to select and use media, draughting techniques and presentation in producing construction drawings set drawing parameters
- demonstrated ability to measure and record the physical details of a building interior
- edit drawing entities
- use drawing aids

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- safety techniques appropriate to computer usage
- basic computer skills
- setting drawing parameters
- creating drawing entities
- edit drawing entities
- use of drawing aids
- managing layers and line types
- operating output devices
- using symbol libraries
- using macro/LISP capabilities
- developing 2-dimensional drawings

Skill

The ability to:

- practice safety techniques for using computer work station
- set up computer workstations to produce to produce drawings
- manipulate and manage computer files
- use computer hardware and CAD software commands to produce 2D and 3D drawings
- apply knowledge of macro and LIST programming to troubleshoot macro and LIST routines
- select format for preparing schedule
- take measurement and record dimensions for preparing schedules
- complete and reference data for schedule preparation
- select suitable specification document
- prepare specifications
- obtain checks and approval of prepared specifications



(4) Resource Implications

- a situation, real or realistically simulated, requiring production of working drawings for buildings
- the learner and trainer should have access to appropriate documentation and resources normally used in the workplace

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the key competencies.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.



CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level	
Communicate ideas and information	Level	
Plan and organise activities	Level	
Work with others and in team	Level	
Use mathematical ideas and techniques	Level	
Solve problems	Level	
Use technology	Level	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGBCD0042A: Prepare 2D & 3D drawings using computer aided design (CAD) systems

Competency Descriptor:

This unit deals with the skills and knowledge required to produce two-dimensional and three-dimensional drawings using the computer-aided equipment

Competency Field: Building & Construction – Building Drawings

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Prepare CAD environment	<p>1.1 Purpose of drawing, type and other relevant instructions and/or information clearly understood.</p> <p>1.2 Methods and media selected for developing and producing drawing are suitable for the drawing required and resources.</p> <p>1.3 Computer system variables are customised to suit standard operating procedure.</p> <p>1.4 Menus are customised to suit standard operating procedure.</p> <p>1.5 Drawing parameters are customised to standard operating procedure.</p> <p>1.6 Macros are developed to standard operating procedure.</p> <p>1.7 Incomplete and inconsistent input information is appropriately clarified and rectified.</p>
2. Prepare Dimensional drawings	<p>2.1 Drawings are created using the full capability of the available software system.</p> <p>2.2 Drawing entities are linked to database attributes to suit job requirements.</p> <p>2.3 Detailed views of Dimensional construction elements and components are created using various scales to meet job requirements.</p> <p>2.4 Drawings edited using appropriate computer commands and procedures.</p> <p>2.5 Drawings and associated graphical material produced are complete, accurate and comply with design information and relevant documentation.</p>

- 2.6 Deviations from standard conventions where occurred, are justified and are indicated clearly.
- 2.7 Checks conducted and approvals obtained regarding content and presentation of drawings.
- 2.8 Files are saved in various formats to standard operating procedure.
- 2.9 Where required, files are sent to relevant personnel in the appropriate format via the internet.
- 2.10 Reproduction and record keeping consistent with quality assurance procedures.

RANGE STATEMENT

This unit applies to the production of 2D and 3D drawings file management and associated customisation of installed software including the use of macros, menus and default.

Entity means any single item created on the screen and includes for example: lines, arcs, circles, text, hatch and dimensions.

Types of drawings to include:

- location plans
- sketches (building – internal/external, components, landscaping)
- working - construction, implementation
- schedules (doors, windows, finishes)
- presentation drawing: 20/30, 1 point, 2 point parametric (e.g. isometric) or perspective techniques, birds and standards, worms eye

Purpose of drawing to include:

- locate position
- show relationships
- define shape
- communicate design
- procurement
- contract definition
- construction/production

Construction elements to include:

- substructure
- superstructure
- walls (hollow, solid)
- floor (in-situ concrete, precast concrete suspended, timber suspended)
- roof (pitched, flat)

Construction drawings:

- plane geometrical figures
- location drawings
- floor and roof plans, elevations, building sections details, etc
- projections – isometric, oblique, etc

Installation of components to include:

- door-set in structural opening
- window frame in structural opening
- glazing (fixed,/operable), storefronts
- handrails, mouldings, cooler boxes, freezers

Connection of two construction elements to include:

- substructure to superstructure
- floor to wall
- wall to roof

File formats may include:

- IGES
- DXF
- HPGL

Checks and approval of drawing to include:

- format
- presentation
- accuracy
- technical content
- completeness
- referencing
- cross-referencing/coordination
- status
- correlation with associated documents
- shape
- dimensions
- tolerances
- composition
- fixing
- annotation
- symbols
- conventions

Construction components to include:

- door-set (external, internal)
- window (casement, sliding sash, fixed light)
- bathroom/kitchen fixtures and fittings
- handrails, stairs, elevator, etc

Drafting equipment:

- computer equipped with AutoCAD software
- printer

Drawing conventions:

- detailing standards
- codes of practice
- local industry conventions

Completion checks of drawing to include:

- accuracy
- correct scales
- line density
- annotation
- north point
- title panel (block)
- layout of drafted elements/sub-components
- presentation
- completeness

EVIDENCE GUIDE

Competency is to be demonstrated by developing drawings and schedules in accordance with the performance criteria and the range listed within the range statement.

(1) Critical Aspects and Evidence

It is essential that competence be observed in the following aspects:

- practice safety techniques appropriate to computer usage
- demonstrate basic computer skills
- set drawing parameters
- create drawing entities
- edit drawing entities
- use drawing aids
- manage layers and line types
- operate output devices
- use symbol libraries
- use macro/LISP capabilities
- develop two dimensional drawings
- develop three dimensional drawings

(2) Pre-requisite Relationship of Units

BCGCOR0031A	Read and interpret simple drawings
ITICOR0231A	Operate a personal computer (Basic)

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- ergonomics problems relating to computer work stations
- safety precaution to observed when using computer equipment for CAD applications
- the function of CAD commands that are used to produce 2D drawings
- the function of CAD commands that are used to produce 3D drawings
- macro and lists identification
- procedure for creating 2D drawings
- display commands used to create 2D drawings
- procedure for creating 3D drawings
- display commands used to create 3D drawings

Skills

The ability to:

- practice safety techniques for using computer work station
- set up computer workstations to produce drawings
- manipulate and manage computer files
- use computer hardware and CAD software commands to produce 2D & 3D drawings
- apply knowledge of macro and LIST programming to troubleshoot macro and LIST routines

(4) Resource Implications

The following resources should be made available:

- access to computer aided drafting equipment and work station
- drafting, schedule and specification information

(5) Method of Assessment

Competency may be assessed in a drafting office or classroom environment, in accordance with work practices and safety procedures and under supervision of supervisor or instructor.

Competency in this unit would be determined by an individual working alone or based upon integrated project work.

Assessment would be continuous by checking at the various stages of the job application in accordance with the performance criteria.

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both on and off the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate will have access to drawing instrument, equipment, materials and documentation required.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 1	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

**BCGBCD0053A: Prepare drawings, specifications and schedules using computer aided design (CAD) systems**

Competency Descriptor:

This unit deals with the skills and knowledge required to prepare drawings, specifications and schedules for conventional residential structures using the computer-aided

Competency Field: Building & Construction– Building Drawings

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1. Prepare CAD environment	1.1	Purpose of drawing, type and other relevant instructions and/or information clearly understood.	
	1.2	Methods and media selected for developing and producing drawing are suitable for the drawing required and resources.	
	1.3	Computer system variables are customised to suit standard operating procedure.	
	1.4	Menus are customised to suit standard operating procedure.	
	1.5	Drawing parameters are customised to standard operating procedure.	
	1.6	Macros are developed to standard operating procedure.	
	1.7	Incomplete and inconsistent input information is appropriately clarified and rectified.	
2. Prepare drawings	2.1	Drawings are created using the full capability of the available software system.	
	2.2	Drawing entities are linked to database attributes to suit job requirements.	
	2.3	Detailed views of construction elements and components are created using various scales to meet job requirements.	
	2.4	Drawings and associated graphical material produced are complete, accurate and comply with design information and relevant documentation.	
	2.5	Deviations from standard conventions are justified and are indicated clearly.	
	2.6	Checks and approvals regarding content and presentation of drawings obtained.	



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| | 2.7 | Files are saved in various formats to standard operating procedure. |
| | 2.8 | Reproduction and record keeping consistent with quality assurance procedures. |
| 3. Read and interpret plans and specifications | 3.1 | Inter-relationships between plans and specifications are identified and interpreted. |
| | 3.2 | Location and interpretation of key information is identified according to drawing and specifications. |
| | 3.3 | Detailed views of construction elements and components are correctly interpreted. |
| 4. Prepare schedules | 4.1 | The selected format of schedules meets production process, methods of measurement and intended use. |
| | 4.2 | Dimensions are measured accurately from source documentation according to standard requirements. |
| | 4.3 | Data is complete and referenced correctly to drawings by specification labelling using appropriate standards. |
| | 4.4 | Quantities checked and corrected for congruence, balancing checks completed. |
| | 4.5 | Quantities and descriptions checked for and amended where necessary for completeness and syntax. |
| 5. Prepare specifications | 5.1 | The type of specification document selected is suitable for the purpose. |
| | 5.2 | The specification does not include duplicate and contradictory information and stipulation. |
| | 5.3 | The specification is consistent with other design documentation. |
| | 5.4 | Specification information is based on identified application and current source information. |
| | 5.5 | Standardised technical clauses used to define quality, type and standard of the materials, products and workmanship required. |
| | 5.6 | The specification is concise, structured logically, referenced and cross-referenced accurately. |
| | 5.7 | The specification of materials, products and workmanship conforms to recognised standards and codes of practice. |



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| 6. Prepare performance specifications | 6.1 Responsibilities for the specified area are accurately identified and defined. |
| | 6.2 Appropriate functional performance requirements are identified, analysed and defined. |
| | 6.3 The specification of performance conforms to recognised standards and codes of practice. |
| | 6.4 The performance requirements are supported by data which assists in identifying acceptable solutions. |
| | 6.5 Checks and approvals regarding content and presentation of specifications are obtained. |

RANGE STATEMENT

This unit applies to the production of drawings, file management and associated customisation of installed software including the use of macros, menus and default.

Entity means any single item created on the screen and includes for example: lines, arcs, circles, text, hatch and dimensions.

Types of drawings to include:

- location plans
- sketches (building – internal/external, components, landscaping)
- working - construction, implementation
- schedules (doors, windows, finishes)
- presentation drawing: 20/30, 1point, 2 point parametric (e.g. isometric) or perspective techniques, birds and standards, worms eye

Purpose of drawing to include:

- locate position
- show relationships
- define shape
- communicate design
- procurement – materials, labour
- contract definition
- construction/production

Construction elements to include:

- substructure
- superstructure
- wall (hollow, solid)
- floor (in-situ concrete, precast concrete suspended, timber suspended)
- roof (pitched, flat)

Construction drawings:

- plane geometrical figures
- location drawings
- floor and roof plans, elevations, building sections details, etc
- projections – isometric, oblique, etc

Construction components to include:

- door-set (external, internal)
- window (casement, sliding sash, fixed light)
- bathroom/kitchen fixtures and fittings
- handrails, stairs, elevator, etc

Installation of components to include:

- door-set in structural opening
- window frame in structural opening
- glazing (fixed,/operable), storefronts
- handrails, mouldings, cooler boxes, freezers



Completion checks of drawing to include:

- accuracy
- correct scales
- line density
- annotation
- north point
- title panel (block)
- layout of drafted elements/sub-components
- presentation
- completeness

Drawing conventions:

- detailing standards
- codes of practice
- local industry conventions

Connection of two construction elements to include:

- superstructure to superstructure
- floor to wall
- eaves to roof

Drafting equipment:

- computer equipped with AutoCAD software
- printer

Types of schedules to include:

- schedules of rates
- schedules of work materials
- data base and spread sheet

Use of schedules to include:

- procurement
- contract
- production

Checks and approval of drawing to include:

- format
- presentation
- accuracy
- technical content
- completeness
- referencing
- cross-referencing
- status
- correlation with associated documents
- positioning
- shape
- dimensions
- tolerances
- composition
- fixing
- annotation
- symbols
- conventions

Construction elements to include:

- substructure/foundation
- skylight/dormers, etc
- wall (hollow, solid), partition (demountable)
- floor (in-situ concrete, precast concrete suspended, timber suspended)
- roof (pitched, flat)
- super structure (columns, stairs, elevator shafts, plumbing. Electric, etc.

Source of specification information

- design information
- statutory requirements
- Building Standards
- codes of practice
- technical literature

Purpose of specification to include:

- obtain consents
- procurement
- contract
- production



File formats may include:

- IGES
- DXF
- HPGL

Types of specification include:

- original document
- industry/practice standards

EVIDENCE GUIDE

Competency is to be demonstrated by developing drawings, schedules and specifications in accordance with the performance criteria and the range listed within the range statement.

(1) Critical Aspects and Evidence

It is essential that competence be observed in the following aspects:

- Practice safety techniques appropriate to computer usage.
- Demonstrate basic computer skills.
- Set drawing parameters.
- Create drawing entities.
- Edit drawing entities.
- Use drawing aids.
- Manage layers and line types.
- Operate output devices.
- Use symbol libraries.
- Use macro/LISP capabilities.
- Develop two-dimensional drawings.
- Develop three-dimensional drawings.
- Prepare at least two types of schedules.
- Prepare specifications.

(2) Pre-requisite Relationship of Units

BCGCOR0031A	Read and interpret simple drawings
ITICOR0231A	Operate a personal computer (Basic)
BCGCDP0042A:	Prepare 2D drawings using computer aided design (CAD) system
BCGCDP0052A:	Prepare 3D drawings using computer aided design (CAD) system

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- ergonomics problems relating computer work stations
- safety precaution to observed when using computer equipment for CAD applications
- the function of CAD commands that are used to produce 2D and 3D drawings
- macro and lists identification
- procedure for creating 2D and 3D drawings
- display commands used to create 2D and 3D drawings
- theories, principles and methods to:
- produce schedules in formats to meet requirements and uses
- measure reference and clarify dimensions, data quantities and descriptions from required sources
- identify checks and approvals relating to content and presentation of schedules
- types of schedules
- standard requirements for measurement of schedules
- types of input information for schedules
- syntax for quantities and descriptions
- forms of specification for schedule
- specification development
- selection and drafting of technical clauses to meet requirements
- structure, reference and cross-reference specifications
- standards for specification

Skills

The ability to:

- practice safety techniques for using computer work station
- set up computer workstations to produce to produce drawings
- manipulate and manage computer files
- use computer hardware and CAD software commands to produce 2D and 3D drawings
- apply knowledge of macro and LIST programming to troubleshoot macro and LIST routines
- select format for preparing schedule
- take measurement and record dimensions for preparing schedules
- complete and reference data for schedule preparation
- select suitable specification document
- prepare specifications
- obtain checks and approval of prepared specifications

(4) Resource Implications

The following resources should be made available:

- access to computer aided drafting equipment and work station
- drafting, schedule and specification information

**(5) Method of Assessment**

Competency may be assessed in a drafting office or classroom environment, in accordance with work practices and safety procedures and under supervision of supervisor or instructor.

Competency in this unit would be determined by an individual working alone or based upon integrated project work.

Assessment would be continuous by checking at the various stages of the job application in accordance with the performance criteria.

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both on and off the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

The candidate will have access to drawing instrument, equipment, materials and documentation required

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 2	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGBCD0063A: Produce working drawings for residential building

Competency Descriptor:

This unit deals with the skills and knowledge required to read and interpret plans/specifications and to undertake basic architectural drafting of conventional residential structures. It includes the production of two and three-dimensional drawings in accordance with standard industry drawing practice and to a level suitable for building permit approval.

Competency Field: Building and Construction - General – Building Drawings

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Use drawing instruments, equipment and materials to set out drawings	1.1	Drawing instruments, equipment and materials are used to produce scaled line work, simple geometric shapes, lettering, numbering and the correct setting out of drawings.
2.	Produce drawings at varying scales using architectural conventions for line work, lettering and symbols	2.1	Line work is applied in a range of different types and media in accordance with standard industry drawing practice.
		2.2	Hand letter text is formed in a variety of formats.
		2.3	Different drawing scales are identified and used.
		2.4	Graphic symbols are identified and used.
		2.5	Orthographic projection in building drafting applications, are drawn accurately to scale.
		2.6	Notations and dimensions are added to complete drawing.
3.	Read and interpret plans and specifications for a single storey dwelling	3.1	Inter-relationships between plans and specifications are identified and interpreted.
		3.2	Location and interpretation of key information is identified according to drawing and specifications.
4.	Draw three-dimensional sketches	4.1	Annotated 3D sketches of various building components using parametric (eg isometric) or perspective techniques are produced to specifications.
5.	Produce building permit approval drawings	5.1	Building permits approval drawings including detailed specification notes for residential dwellings are completed to architectural conventions.

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment. The following variables may be present for this particular unit:

Input to the production of working drawings for residential buildings is to include but is not limited to:

- two (2) and three (3) dimensional drawings
- plan and specification interpretation
- single storey dwellings (elementary or conventional)
- relevant building codes of Jamaica
- computer generated or paper based presentations
- site plans, floor plans, sections, elevations, projections, details, general notes, construction notes, area analysis, services, location or neighbouring buildings

Application of National Building Standards relevant to:

- masonry
- reinforcement
- architectural drawing and supplement
- residential slabs and footings
- residential timber framing

Production of building drawings may include but not be limited to:

- drawing protocols which include, symbols, lettering standards, standard units of measurement, paper size, scale, numbering, legends, abbreviations
- land surveyor plans, levels and contours
- certificate of title to land, excavation cut and fill
- retaining walls, banks and landscaping
- sewerage connection and easements plan
- storm water connection and easements plan
- general plumbing services plan, electrical connections plan
- soil classification and tests
- base structure, timber and masonry
- wall construction, timber and masonry
- internal and external wall claddings
- roof construction
- upper floor construction
- chimney construction
- composite construction (e.g. steel and timber)
- complex roof and wall shapes
- flashings and box gutters
- stairs
- glazing including bay window construction
- window and door schedules
- insulation and sarking
- cathedral ceilings
- large span timber beams and connections (including glue laminated beams)
- joinery
- conversion of plans and specifications to architectural/building detail

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Performance Criteria and Range Statement

(1) Critical Aspects of Evidence

- Compliance with occupational health and safety regulations applicable to workplace operations.
- Application of organisational management policies and procedures including quality assurance requirements where applicable.
- Production of two and three-dimensional drawings for residential building projects, including at least one orthographic, one isometric and one perspective drawing.
- Provision of drawings to appropriate body/individual as determined by the project brief.
- Application of strategic plans, workplace policies and procedures.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- processes for the interpretation of reports, working drawings and specifications
- drafting and drawing protocols
- relevant national, statutory legislation and local government policy and procedures
- structural, design and construction principles of buildings
- terminology, definitions and fault identification
- codes of conduct and ethics
- research methods
- processes for the administration and preparation of documentation

Skills

The ability to:

- research, analyse, organise and understand the application and production of working drawings for residential buildings
- communicate and negotiate ideas and information to translate legislation enabling production of working drawings for residential buildings
- plan and organise activities including the planning of working drawings for residential buildings and analytical processes related to organisation of regulatory factors
- work with others and in a team by recognising dependencies and using co-operative approaches to optimise satisfaction and productivity

Underpinning Knowledge and Skills (Cont'd)

Skills

The ability to:

- establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage
- use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, scales and numbering systems, quantify, survey and present analytical results
- use workplace technology related to information gathering and analysis, diagnosis, information research, report writing, production of working drawings, administration and management procedures

(4) Resource Implications

- a situation, real or realistically simulated, requiring working drawings for residential buildings
- the learner and trainer should have access to appropriate documentation and resources normally used in the workplace

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1	Level 2	Level 3
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGBCD0083A: Apply mathematics to construction applications

Competency Descriptor:

This unit deals with the skills and knowledge required to use mathematical formulas to calculate requirements for specified construction applications

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Applying algebraic techniques to construction applications	1.1 Information relevant to the application is accurately extracted from tables, charts and supplied data. 1.2 Equations appropriate to the application are identified. 1.3 Calculations are performed accurately and results presented in current SI units using equations appropriate to the application. 1.4 Data is accurately presented graphically using scales appropriate to the application.
2. Apply geometrical principles to construction applications	2.1 Information relevant to the application is accurately extracted from tables, charts, drawings and supplied data. 2.2 Equations suitable for the application are used. 2.3 Calculations are performed accurately and results presented in correct metric units using equations appropriate to the application. 2.4 Calculations are presented in a format appropriate to the application.
3. Apply basic statistical concepts to construction applications	3.1 Information relevant to the application is accurately extracted from tables, charts and supplied data. 3.2 Formulae appropriate to application are identified. 3.3 Calculations are performed accurately and results presented in correct units, using data and formulae appropriate to the application. 3.4 Data is presented graphically using scales appropriate to the application.

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| 4. Investigate calculus principles to construction applications | 4.1 | Information relevant to the application is accurately extracted from tables, charts, plans and supplied data. |
| | 4.2 | Algebraic and trigonometric functions appropriate to application are identified. |
| | 4.3 | Differentiation and integration performed accurately by methods appropriate to the application. |
| | 4.4 | Data is presented graphically using scales appropriate to the application. |
| 5. Apply trigonometric techniques and co-ordinate geometry to construction applications | 5.1 | Information relevant to the application is identified and accurately extracted from tables, plans and supplied data. |
| | 5.2 | Formulae appropriate to the application are identified. |
| | 5.3 | Calculations are performed and result presented in correct units using data and formulae appropriate to the application. |
| | 5.4 | Calculations are presented in format appropriate to the application. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Application of algebraic techniques includes:

- thermal properties of composite materials
- optimum wall to window ratios
- simple beam reactions
- shear force
- bending moment
- modules of electricity
- stress, strain bending theory
- site clearance to given level
- estimation of materials to be removed from site, excavation for foundations and service trenches
- dimensional control during construction in 2-D and 3-D
- quantities of materials for embankments, surface areas (e.g. tiles, glass, roof area)
- material quantities for groundwork reinforcing formwork, concrete)
- areas of enclosure
- velocity
- acceleration
- gradient graphs
- vertical curves
- horizontal curves
- maximum bending moments

Equations include:

- linear, quadratic, simultaneous, cubic, logarithmic, binomial
- geometrical properties of regular figures
- mid-ordinate and trapezoidal rule
- Simpson's rule
- ellipses
- prismoidal rule
- theorem of Pappus
- relationship between degrees and radians
- perpendicular distance from point to plane
- points and angles of intersections
- true angle between two lines

Supplied data:

- building regulations
- table of material properties
- building standards
- section size data (steel, concrete and timber)
- tables of material properties
- laboratory test results
- resource utilization (labour, plant, material, computer statistics)

Graphical presentation includes:

- linear graphs
- quadratic graphs
- exponential graphs

Integration method includes:

- by-parts
- substitution

Formulae include:

- arithmetic mean, median, mode
 - variance
 - standard deviation
 - quantiles and percentiles
 - central tendency
 - frequency
 - sine (0-360 degree), cosine (0-360 degree)
tangent (0-360 degree)
 - sine rule, cosine rule
- areas of triangles (right angled, non- right angled)

Calculation using manual and scientific calculator includes:

- thermal (heat transmittance, conductivity, resistivity)
- structural (force, moment, stress, strain)
- building applications (wall/floor/window ratio)
- areas volume, linear, angular

Differentiation method:

- quotient rule
- product rule
- chain rule

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

- application of organisational management policies and procedures including quality assurance requirements where applicable
- application of algebraic techniques to at least three construction applications
- application of geometrical principles to at least three construction applications
- demonstration of knowledge of basic statistical concepts to construction applications
- investigation of calculus principles to construction applications
- application of trigonometric techniques and co-ordinate geometry to construction applications

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- processes for the collection and recording of data
- terminology and definitions
- tackling problems
- research methods
- interpretation and presentation of data
- processes for the administration and preparation of documentation

Skill

The ability to:

- collect and record data
- carry out calculation and solve problems
- interpret and present findings

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Method of Assessment (CONT'D)

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 3	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGBCD0093A: Demonstrate knowledge of the science of materials and its applications

Competency Descriptor:

This unit deals with the skills and knowledge required to apply knowledge of the science of materials to building and construction application

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Investigate the properties and use of materials	1.1 The appearance and properties of materials are described.
	1.2 Standard units are derived by combining base units.
	1.3 Practical values for the properties are calculated using test data from secondary sources.
	1.4 The conditions under which materials will be used are identified.
	1.5 The suitability of materials for use in given conditions is evaluated.
2. Determine the properties of materials	2.1 Properties of materials to be determined are described.
	2.2 Test equipment to perform test procedures is used in accordance with safety procedures identified in literature provided by equipment manufacturers.
	2.3 Tests performed are described and results recorded.
	2.4 Values for the properties are calculated from tests results using the correct units.
	2.5 Properties are explained in terms of scientific principles.
3. Investigate the properties of a designed concrete mix	3.1 The requirements of a designed concrete mix for a given application are described.
	3.2 Major constituents of the mix and their properties are described.
	3.3 Calculations are performed on the predicted test results to determine the properties of the designed mix.

- 3.4 A designed mix is made following safety procedures and test results are predicated using information from secondary sources.
- 3.5 Calculations are performed on the predicted test results to determine the properties of the designed mix.
- 3.6 The properties of the designed mix are explained in terms of the properties and proportions of the constituents.

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Properties of materials:

- mechanical (density, elasticity, yield stress, breaking stress, ductility, hardness, toughness, brittleness, durability)
- thermal (heat resistance, thermal movement)
- electrical conductivity
- chemical (corrosion, flammability)
- moisture (movement, insulation),
- compressive strength
- water absorption
- thermal movement
- Young's modulus

Material types include:

- naturally occurring
- processed (e.g.) aggregate, timber, stone)
- manufactured (e.g. timber products, clay products, concrete, concrete blocks, metals, plastics and bituminous material)
- timber products (e.g. plywood, chipboard; medium-
- density board)

Units of measure relating to the following calculations:

- of density - volumes of simple and irregularly - shaped solids, ratios, use of estimation to check calculations
- of elasticity, yield stress, breaking stress formula transposition, measurement from graphs, use of estimation to check calculations
- of durability, moisture properties - percentages for porosity and water absorption, ratios and measurement from graphs

Test equipment include:

- for compressive strength – testing machine with a load range
- for testing timber and blocks samples
- for water absorption – low temperature drying oven, water tank, electronic scales
- for thermal movement - measuring frame, mechanical or electrical linear measuring equipment, heating/cooling equipment, water tank
- for young's modulus – tensometer

Standard test procedures:

- rate of loading
- test specimen size
- number of sample
- sample preparation

Properties of constituents:

- concrete setting time
- aggregate grading and moisture content
- silt/clay content in fine aggregate

Properties of mix:

- workability
- compressive strength

Safety procedures:

- COSHH
- HSAWA
- Safety in Science Laboratories - DFE Safety Series

Predicted test results:

- compressive strength
- workability

Major constituents concrete mix:

- cement
- sand
- normal-density aggregate
- water

Requirement of a designed concrete mix:

- strength grade
- minimum or maximum cement content
- free water/cement ratio (workability)

Applications:

- non-reinforced concrete foundations
- reinforced concrete beams

Calculations:

- calculations of areas and stress
- statistical analysis
- percentages for error limits

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- Compliance with occupational health and safety regulations applicable to workplace operations.
- Application of organisational management policies and procedures including quality assurance requirements where applicable.
- Demonstrated knowledge of the properties and uses of building materials.
- Description of tests performed on materials and the results recorded
- Results of calculated values of material properties from tests using the correct units.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- appearance and properties of materials
- standard units derived by combining base units
- practical values for the properties of materials
- suitability of materials for use in given conditions
- test equipment to perform test procedures is used in accordance with safety procedures
- requirements of a designed concrete mix for a given application
- major constituents of the mix and their properties

Skill

The ability to:

- collect, organise and understand drawings, plans and other related documentations in order to take-of specifications
- use mathematical ideas and techniques to correctly calculate test results
- work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity
- use workplace technology related to measurement and testing materials
- communicate ideas and information to enable confirmation of work requirements and specifications and the reporting of work outcomes and problems

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment. If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- a real or simulated environment
- a project plan
- a range of people, equipment and resources, locations or sites
- organisation policies and guidelines
- relevant legal and statutory documentation

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority or client.

(6) Context of Assessment

Evidence may be gathered in a real or simulated environment on or off the job or by examination of a portfolio. Portfolio could include examples of work, client reports or management reports.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGBCD0103A: Apply knowledge of structural mechanics to construction applications

Competency Descriptor:

This unit deals with the skills and knowledge required to determine and apply knowledge of the structure of mechanic as it relates to the application in building and construction

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Describe the performance of structural elements in use	1.1 The effects of loading configurations on structural elements are illustrated graphically.
	1.2 The requirements of stability for structural elements are explained.
	1.3 The transmission of loading through structural systems is illustrated graphically.
2. Calculate the effects of loading on beams and how beams resist these loads	2.1 Reactions for simple supported beams are calculated.
	2.2 Shearing force and bending moments at any point along a beam are calculated and plotted.
	2.3 Sectional properties of beams of given cross-sections are calculated.
	2.4 Sizes and shapes of beams to satisfy design limits are determined.
3. Describe the behavioural characteristics of walls, columns and struts when subjected to loads	3.1 The effects of loads and moments on columns and walls are calculated.
	3.2 The effects of cross sectional properties to counteract bending stresses are explained.
	3.3 Column stresses resulting from loads are calculated.
	3.4 Sections of short columns, struts and walls are determined to satisfy design limits.

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|----|---|-----|--|
| 4. | Describe axial forces in pin-jointed frames caused by direct and wind loading | 4.1 | Vertical and horizontal components of forces at all node points are determined and support reactions calculated. |
| | | 4.2 | The forces in the members of statically determined frames are calculated using different methods. |
| | | 4.3 | The sizes and shapes of the framed members are determined to satisfy design limits. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Effects of loading configurations on structural elements to include:

- compression
- bending
- deflection
- shear

Structural elements:

- columns
- struts
- walls
- beams
- slabs
- lattices

Requirements of stability for structural elements:

- Newton's Laws (summations of vertical forces; summation of horizontal forces; summation of clockwise and anti-clockwise moments)
- resistance to settlement
- resistance to lateral movement

Loading configurations include:

- point loads
- uniform loads
- composite loads
- triangular loads

Effect of loads and moments include:

- axial stresses (from beams and roof members, self weight)
- eccentric stresses (translation of bending into compression and tension)

Effects of sectional properties include:

- area of tension and compression flanges
- radius of gyration related to length for buckling of compression flange
- section modulus for direct bending stresses

Structural systems include:

- cellular (wall and slab)
- framed (beam and column, flat slab and column)
- frameworks (portal frames, three pinned arches)
- lattices roof trusses

Sizes and shapes of beams to satisfy design limits:

- resist compression
- resist buckling
- resist bending

Reactions for simple supported beams:

- use stability equations (summation of vertical forces, summation of clockwise and anti clockwise moments)
- beams with overhanging ends
- loading (point, uniformly distributed, triangular, composite)

Components of force:

- wind loads (positive pressures, negative pressures, horizontal components, vertical components)
- from structure (loads from rafters and purlins, suspended loads, earthquake loads, access loads)

Methods of calculation:

- graphical and semi-graphical analysis using Bow's notation for direct forces
- method of sections
- joint resolution

Design limits include:

- stresses (working and design stresses, factors of safety)
- conditions (deflection, bending, shear, load factors)
- safe loading for beams of given cross section
- cross sections of beams for given loading

Effects of sectional properties include:

- area of tension and compression flanges
- radius of gyration related to length for buckling of compression flange
- section modulus for direct bending stresses

Shearing forces calculations:

- plotting along the beam against reactions
- conventions
- graphic presentation

Bending moments calculations:

- by moments
- by area of shear force diagram
- plotting along the beam
- conventions
- graphic presentation

Frame members:

- struts, ties
- rafters

Warren girders:

- Pratt trusses

Sectional properties:

- moment of resistance
- moment of inertia
- section modulus

Given cross sections:

- solid rectangular
- open rectangular (e.g. box beams)
- T shaped
- Trapezoidal
- I shaped

Forces include:

- tension
- compression
- effect of bending on rafters
- effect of bending on ceiling joists

Sizing of framed members:

- information (tension or compression, working stresses, bending, sectional properties)
- techniques (use of tables, graphs, computer packages)

Design limits

- resist compression
- resist tension
- resist bending (where appropriate)

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- explanation of the effects of load configurations on structural elements
- identification of structural elements
- calculation of the effects of loading on beams and how beams resist these loads
- description of axial forces in pin-jointed frames caused by direct and wind loading and appropriate calculations

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- effects of loading configurations on structural elements
- transmission of loading through structural systems
- reactions for simple supported beams
- shearing force and bending moments
- sizes and shapes of beams to satisfy design limits
- the effects of loads and moments on columns and walls
- vertical and horizontal components of forces

Skill

The ability to:

- calculate reactions for simple supported beams
- calculate and plotted shearing force and bending moments at any point along a beam are
- calculate the effects of loads and moments on columns and walls

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 1	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGBCD0113A: Apply construction technology and services

Competency Descriptor:

This unit deals with the skills and knowledge required to apply the knowledge of construction technology and services to building and construction applications.

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Investigate the provision of primary services for low-rise domestic buildings specification	1.1 The provision of primary services for low-rise domestic buildings in different setting is compared. 1.2 Control and monitoring methods for primary services are described. 1.3 Provisions for waste discharge are described. 1.4 The selection of energy sources for a given domestic building is explained based on a comparison in terms of provision, convenience and cost.
2. Examine the provision of fittings to low-rise buildings	2.1 Storage and display fittings for commercial low-rise buildings are described. 2.2 Food storage, processing and cooking fittings for domestic, commercial and industrial low-rise buildings are compared. 2.3 Sanitary fittings for domestic and commercial buildings are compared. 2.4 Buildings services required to support fittings are described.
3. Investigate the installation of primary services	3.1 Factors which affect the installation of primary services in a low-rise commercial building are explained. 3.2 Design considerations influencing the installation of primary services in the building are explained. 3.3 Functional considerations influencing the installation of primary services in the building are described. 3.4 Methods of providing access to installed primary services are described. 3.5 A typical layout for installed primary services for a low-rise domestic building is sketched in isometric format.

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| | 3.6 | Method of environmental protection and control are described. |
| 4. | Evaluate the use of finishes in low-rise commercial buildings | 4.1 Functions of internal finishes in different enclosures in commercial low-rise buildings are explained. |
| | 4.2 | Materials used for wet and dry applied internal finishes are described. |
| | 4.3 | Self-finished vertical and horizontal surfaces are described. |

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Setting includes:

- urban
- rural
- isolated

Primary services include:

- water
- electricity
- telecommunications

Storage and display fittings:

- cabinets
- counters
- shelving
- racks
- hanging space
- jardinières

Controls and monitoring methods include:

- stopcocks
- water meter
- main fuse
- electricity meter
- consumer panel (fuse boxes, circuit breakers)

Energy sources:

- electricity supply
- kerosene
- bottled gas (propane)

Provisions for waste discharge:

- sanitation and drainage (gullies, traps, back inlet gullies, inspection chambers)

Building services:

- electrical (lighting, ventilation, extraction, power supplies)
- gas (heating, cooking supplies)
- water (cold, hot, storage, supply)
- sanitation and drainage

Criteria for comparison:

- size of building
- frequency of use
- number of users
- need of users
- cost

Food storage, processing and cooking fittings include:

- chill cabinets
- freezers
- cold stores
- worktops
- wash down areas
- disposal units
- hobs
- ovens
- grills
- dishwashers

Sanitary fittings include:

- toilets (individual, communal)
- wash-basins
- baths
- showers
- bidets
- incinerators

Primary services:

- cold water (direct, indirect)
- hot water (direct, indirect)
- gas for cooking
- electricity for lighting
- electricity for power
- sanitation
- electronics communications

Factors to include:

- size
- intake position
- spatial layout
- building regulations
- environmental health legislation
- protection
- accessibility

Internal finishes include:

- wet finish
- dry finish
- self finish
- applied finish

Design considerations include:

- shapes and sizes of enclosures
- natural and artificial lighting
- natural and mechanical ventilation
- control of air changes
- orientation of buildings
- materials used for construction
- thermal transmission and insulation
- acoustic transmission and insulation

Functional considerations include:

- numbers of occupants
- lighting loads
- power loads
- cooling loads
- volumes of stored hot and cold water
- sanitation loads

Method of protecting the environment include:

- legislation (e.g. environmental protection regulations)
- Town and Country Planning Act
- water resources regulations
- organisations (e.g. environmental health, planning authorities)

Surfaces are:

- internal (floors, walls, ceilings)
- external (walls, roofs)

Functions of internal finishes include:

- floors (non-slip, impact resistant, hygienic, durable, acoustic)
- walls (reflection of light and sound, absorption of light and sound, resistance to flames)

Enclosures in commercial buildings include:

- display areas
- changing rooms
- commercial kitchens
- hotel bedrooms and en-suite bathrooms
- conference rooms

Materials used:

- for wet finishes - screeds, renders (sand, cement); plasters (gypsum, vermiculite)
- for dry finishes - plasterboard, wall boards, plywood panelling, tiles (ceramic, cork, plastic, mineral board); plastic laminate sheet

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- report of investigation of the provision of primary services for low-rise domestic buildings specification
- examination report on the provision of fittings to low-rise buildings
- documentary report on investigation of the installation of primary services
- evaluation on the use of finishes in low-rise commercial buildings

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- services (water, gas, electricity, telecommunications)
- pattern of services availability
- location of major supply pipes and cables
- relation to streets and buildings
- location of street junction
- transformers and connection points
- need for control and monitoring devices
- isolation (emergency access)
- energy management (efficiency, cost)
- methods of protecting the environment
- functional consideration in designing services
- design considerations of services

Skill

The ability to:

- describe the pattern of services availability in a chosen locality
- describe the need for control and monitoring devices for services
- assess the suitability of internal services for a given building
- select internal services for a given building and explain reasons for the selection

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGBCD0123A: Apply knowledge of building designing, detailing and specification

Competency Descriptor:

This unit deals with the skills required to apply knowledge of building designing, detailing and specification to specified building and construction applications

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Investigate the elements of a design specification	1.1 Elements of a designed specification are identified.
	1.2 The needs of different clients for construction projects are explained.
	1.3 The design features of the designed specification are described.
	1.4 Design constrains are evaluated for their impact on the cost and build ability of the project.
2. Evaluate completed designs against their specification	2.1 Key design features for a completed design are identified.
	2.2 Key construction constraints for a completed design are assessed for their impact on construction.
	2.3 Design and performance standards are identified within completed designs.
	2.4 The main aspects of legislation applied to completed designs are described.
	2.5 Completed designs are assessed against the elements of the clients design specification.
3. Interpret drawings and schedules as methods for communicating information	3.1 Information to be communicated for constructing projects is described.
	3.2 Methods for communicating information are described.
	3.3 Recommended conventions and symbols to facilitate communications of information are described.
	3.4 Information on drawings and schedules is interrupted.

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| 4. | Explore the use of Computer Aided Design (CAD) within the drawing process | 4.1 | Applications of CAD within the construction industry are described. |
| | | 4.2 | Advantages and disadvantages of using CAD systems are assessed against manual methods. |
| | | 4.3 | The functions of the main hardware components of a CAD system are identified. |
| | | 4.4 | The user-friendliness of CAD software is described. |
| 5. | Produce plan of building components | 5.1 | The types and uses of information relating to blue print interpretation and development explained accurately. |
| | | 5.2 | The types of and the reasons for divisions of blue print accurately explained. |
| | | 5.3 | Architectural symbols are accurately identified and drawn to standard specification. |
| | | 5.4 | Drawing instruments and materials are accurately identified and selected based on specified use. |
| | | 5.5 | The ability to demonstrate competency in the selection and use of drawing instrument must be demonstrated. |
| | | 5.6 | Acceptable procedures for drawing plan of building components correctly followed. |
| | | 5.7 | Building components plans are drawn to the correct dimensions contain all relevant information and the correct symbols are used. |
| | | 5.8 | Working knowledge of the types of fixtures and fixture schedules be demonstrated. |
| | | 5.9 | Fixture schedules are drawn completely and accurately. |
| | | 5.10 | Working knowledge of types of doors and windows, methods of construction and their application demonstrated. |
| | | 5.11 | Evidence of the ability to identify the type of internal finishes, their application and characteristic accurately demonstrated. |
| | | 5.12 | Drawing of internal finishes contains all relevant details of type, surface finish, location and size. |

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| 5.13 | The ability to identify types and shapes of beams, columns, column bases and their application and characteristics demonstrated. |
| 5.14 | Columns, column bases are drawn showing construction material(s), presented in the appropriate projections and are accurate and complete. |
| 5.15 | Retaining walls are drawn showing the type of wall blocks/brickwork) stone/pre-cast/in-site concrete and provision against ground water built-up. |
| 5.16 | Knowledge of the types and application of staircase demonstrated. |
| 5.17 | The required views/elevations/projections of staircase and construction material are contained in the drawing. |
| 5.18 | The style, dimension, position, etc., of kitchen cupboard, cabinets, appliances and fixtures re correctly drawn. |
| 6. | Produce drawings and schedules |
| 6.1 | Types of drawing projections and techniques are described. |
| 6.2 | Annotated scaled drawings and schedules for low-rise buildings are produced to current standards from given information. |
| 6.3 | Annotated scaled drawings and schedules for an estate road and sewer are produced to current standards from given information. |
| 6.4 | Components of the drawings are detailed in accordance with current standards. |

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Construction projects:

- low-rise buildings
- estate roads

Clients:

- institutions (e.g. speculative housing)

Elements include:

- clients needs
- key design features
- design constraints
- legislation
- design and performance standards
- construction needs

Needs of clients include:

- healthy environment
- economic use of resources
- function (durability, functional form, build-ability, safety, maintenance provision, structure)
- safety (structural stability, flame spread, means of escape, safe functions of building services)

Key design features include:

- dimensional co-ordination (basic arrangement of volumes and space, layout, proportions)
- aesthetics (finish, colour, appearance of materials) design life
- services accommodation
- materials
- macro climate

Design and performance standards include:

- planning standards;
- Jamaica Building Standards (JBS)
- National Environmental Planning Agency (NEPA), American Standard for Test and Materials (ASTM) plan of work
- British Standards

Key construction constraints include:

- physical (building type, site access, site size, site location, services availability, ground condition, adjoining property)
- financial legal (Building Regulation approval, planning consent & statutory regulations)

Legislation includes:

- National Building Code
- Town and Country Planning Act
- Public Health Act
- Health and
- Safety at Work Regulations

Information includes:

- elements (wall, floor, roof, foundations, stairs, structural frame, pavements, services)
- components (doors, windows, ironmongery, services)
- finishes
- size
- layout
- position
- appearance
- quantity
- type

Hardware components include:

- VDU
- processor
- system network
- drawing devices (tablet, mouse, light pen, keyboard)
- storage system (hard disk, floppy disk)

Drawings for a low-rise building:

- elevations
- plans
- sections
- notation & services layout

Drawing techniques include:

- manual (scaling, lettering, symbols and conventions, colour, ink, dimensions)
- computer aided (inputting, storage, retrieval, editing, enlarging & reducing)

Applications include:

- drawings
- drafting
- detailing
- modelling
- designing
- visualisation
- production of schedules
- specification

Advantages to include:

- speed
- improved quality
- improved accuracy
- ease of amendment
- ease of reproduction
- storage

User-friendliness:

- ease of use
- self-explanatory commands
- help
- graphics
- type of display

Types of beams, columns, column bases, etc:

- timber
- concrete
- metal
- concrete

Retaining wall types:

- block
- brickwork
- stonework
- pre-cast
- in-site concrete

Methods include:

- drawings (production, sketch, component, location, services 'as installed')
- schedules (services, finishes, doors, windows, ironmongery)

Plans of building components to include:

- site and location
- floor
- elevation
- roof
- foundation
- electrical
- plumbing
- sectional components

Schedules include:

- type of doors
- window
- frames
- linings to match accordingly

Disadvantages include:

- cost (equipment, training)
- health aspects
- environment
- multiplication of errors

Finishes include:

- ceiling - tiles, sharking, moulding
- skirting
- shelves and cupboards

Staircase types:

- straight
- dogleg
- spiral, etc.

Conventions and symbols:

- American Graphic Standards

Types of drawing projection:

- orthographic
- isometric
- axonometric

Accuracy:

- technical
- dimensional

Components for detailing:

- doors
- windows
- stairs
- floors
- roofs
- gullies
- inspection chambers
- pipe work
- kerning
- footway
- carriageway

Staircase materials:

- timber
- concrete
- metal

Standards:

- appropriate drawing standards

Drawings for an estate road and sewer:

- plans
- longitudinal sections
- cross-sections
- notation

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Performance Criteria and Range Statement

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- produce plan of building components
- produce drawings and schedules
- application of strategic plans, workplace policies and procedures

(2) Pre-requisite Relationship of Units

BCGCDP0053A Prepare drawings, specifications and schedules using computer aided design (CAD) systems

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- forms of specification for schedule
- specification development
- selection and drafting of technical clauses to meet requirements
- structure, reference and cross-reference specifications
- standards for specification

Skill

The ability to:

- select suitable specification document
- prepare specifications
- obtain checks and approval of prepared specifications

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> • Carries out established processes • Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> • Manages process • Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> • Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGBCD0133A: Demonstrate knowledge of economic and legal influences of the construction industry

Competency Descriptor:

This unit deals with the skills and knowledge required to apply knowledge of the economic and legal influences of the construction industry to construction application

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Investigate the economic influences in a construction company	1.1 Economic influences on a construction company are identified.
	1.2 Factors influencing production are described.
	1.3 The organisation and scale of production is described.
	1.4 Macro-economic factors are described.
	1.5 The operation of markets under perfect competition is described.
	1.6 The effect of economic influences on a medium size construction company are explained.
2. Investigate the key aspects of the law of contract and their effect on construction work	2.1 Categories and terms of contract are described.
	2.2 Main essentials of a valid contract are described.
	2.3 Conditions for discharge of a contract are described.
	2.4 Remedies for breach of contract are described.
	2.5 Effects of law of contract on standard forms of contract is identified.
	2.6 Main forms of contracts relating to constructing work are identified.
	2.7 Parties to a construction contract are identified.

- | | |
|---|--|
| 3. Investigate the key aspects of the law of tort and highway law and their effect on construction work | 3.1 Main torts affecting construction work are identified. |
| | 3.2 Remedies available to parties under the law of tort are described. |
| | 3.3 Main effects of the highway law on construction work is described. |
| | 3.4 Effects of the law of tort and highway law on the contractual parties to a contract are described. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Factors influencing production:

- labour
- capital
- land
- entrepreneurial skills
- law of diminishing returns

Economic influences on the construction industry:

- factors of production
- determination of prices and markets
- state subsidies

Macro-economic factors include:

- inflation
- exchange rate
- interest rate
- Government economic policy (e.g. stop/go mechanism)
- economic systems (market, command mixed)
- location of industry

Main essentials of a valid contract include:

- offer and acceptance
- intention to create legal relations
- written formalities
- consideration
- capacity to contract
- genuineness of consent
- legal and possible

Effect of economic influences:

- size of project undertaken
- type of project undertaken
- supply and demand for factors of production
- investment
- competition

Main torts affecting construction work:

- negligence
- nuisance
- trespass
- vicarious liability

Remedies available to parties under the law of tort:

- Volenti non fit injure
- inevitable accident
- act of God
- necessity
- mistake
- intention
- act of state
- statutory authority

Effects of the law of tort and highway law on the contractual parties to a contract:

- provision of insurance policies (property, third party, employee, employer's liability, fire, all-risk)
- provision of site security
- notices of statutory authorities

Main effect of highway law on construction work:

- erection of hoarding
- obstructions to highway (road, pavement)
- street works

Remedies for breach of contract include:

- damages
- specific performance
- quantum merit
- refusal of further performance
- recession
- arbitration litigation

Main forms of contracts relating to constructing work:

- JCC Standard Forms of Building Contract
- ICE Conditions of Contract

Categories of contract:

- simple
- specialty (for e.g., deed)

Parties to a construction contract include:

- employer
- main contractor
- nominated subcontractor
- architect/supervising officer
- engineer
- quantity surveyor
- clerk of works

Terms of contract include:

- express terms
- implied terms
- executed contract
- executory contract

Conditions for discharge of a contract:

- agreement
- performance of law

Effect of law of contract on standard forms of contract:

- essentials of valid contract applies
- discharge conditions apply
- remedies for breach of contract apply

Organisation and scale of production:

- opportunity costs
- economies of scale

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- documentation on the effect of economic influences on a medium size construction company
- identification of the main forms of contracts relating to constructing work and the parties to a construction contract
- correct explanation of the effects of the law of tort and highway law on the contractual parties to a contract

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- economic influences on the construction industry and its effects
- factors influencing production in the construction industry
- types of contract
- main essentials of a valid contract
- parties to a construction contract and their roles
- main torts affecting construction work
- effects of the law of tort and highway law on the contractual parties to a contract

Skill

The ability to:

- carry out research work
- read and interpret technical materials
- prepare technical reports
- communicate with people at various levels within the construction industry and government bodies

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> • Carries out established processes • Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> • Manages process • Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> • Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGBCD0143A: Apply electrical services technology

Competency Descriptor:

This unit deals with the skills and knowledge required to apply electrical services technology to building and construction application

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Investigate electrical power installation in buildings	1.1 Types of power supplies to machinery and equipment are described. 1.2 Types of circuits, cabling, components and control systems are described. 1.3 Cabling, components and control systems are identified from schematic diagrams for the installation of a three-phase machine into a building. 1.4 Design factors affecting the integration of the power supply for machinery and equipment within buildings are described. 1.5 Regulations for the installation of cables are identified.
2. Investigate lighting in a building	2.1 Power supplies for different types of lighting in buildings are identified. 2.2 Types of lighting circuits, cabling, components and control systems are described. 2.3 Cabling, components and control systems are identified from technical information. 2.4 Design factors affecting the integration of internal and external lighting systems for buildings are described. 2.5 The requirements of JS21 1992 relating to lighting circuits are identified.
3. Investigate the technical specification of electrical installation to a building	3.1 Verification and commissioning techniques for electrical installation in a building are described. 3.2 Safe systems of work for verification and commissioning are described. 3.3 Inspection methods for verification and commissioning are described.

- 3.4 Testing methods for verification and commissioning are identified.
- 3.5 Sources of information relating to electrical installation are identified.
- 3.6 General characteristics of electrical supply for a building are described.

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Power supplies are:

- single phase
- three phases

Cabling types include:

- PVC insulated and sheathed
- MICC
- armoured PVC insulated
- bus-bar
- conduit/trunking (metallic, non metallic)

Design factors include:

- cost
- safety
- construction (walls, floors, roofs)
- materials location (distance from the consumer board)
- environmental conditions (temperature, humidity)
- services protection
- services separation
- installation sequencing
- services (e.g. water, compressed air)

Buildings are:

- low rise industrial buildings
- medium-rise commercial building

Machinery and equipment:

- for production (eg. woodworking machinery)
- for processing (eg. dry cleaning)

Electrical circuits:

- ring
- radial
- earthing

Components and control systems include:

- circuit breakers
- meter boxes
- thermostats
- programmers
- joint boxes
- conduits
- switches
- luminaries
- over current devices
- distribution boards

Regulations:

- Jamaica Standards (JS) 21 1992

Types of lighting include:

- internal
- external
- permanent
- temporary
- security
- emergency

Lighting circuits include:

- two plate
- three plate
- energy efficient lighting fittings
- filament
- discharge

Technical information include:

- builders drawings
- cable line diagrams
- manufacturers literature
- technical specifications

Safe systems of work:

- Isolation procedures
- lock off
- testing for live circuitry

Testing methods:

- Continuity of protective conductors
- continuity of final ring
- insulation resistance
- polarity
- earth loop impedance
- earth electrode resistance
- operation of RDC's results and recommendations

Verification and commissioning:

- visual inspection
- continuity of protective conductors
- continuity of final rig
- insulation resistance
- polarity
- earth loop impedance
- earth electrode resistance

Inspection methods:

- visual
- proforma list
- report

Sources of information:

- Health and safety at work and regulations
- JS21 1992 regulations

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- Compliance with occupational health and safety regulations applicable to workplace operations.
- Application of organisational management policies and procedures including quality assurance requirements where applicable.

Critical Aspects and Evidence (Cont'd)

- Identification of types of power supplies, circuits, cabling and components of electrical power installation in a specified building
- Identification of types lighting, lighting circuits, controls and components in a building
- Documentation of techniques for testing, verification and commissioning of electrical installation in a building
- Identification of appropriate regulations and specifications for electrical installation in a building.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- power supply types and their characteristics
- types of electrical circuits and their characteristics
- types of electrical cables and their characteristics
- electrical circuit components and control systems and their application
- appropriate section of Jamaica Standards (JS) 21 1992
- types of lighting systems and their characteristics
- lighting circuits components and arrangement
- methods of testing electrical installation
- verification and commissioning of electrical installation
- electrical safety systems and methods

Skill

The ability to:

- identify electrical power supply types
- identify electrical circuits types
- identify types of electrical cable, circuit components and control
- identify electrical lighting systems
- determine electrical testing and commission methods

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGBCD0153A: Demonstrate knowledge of mechanical services technology

Competency Descriptor:

This unit deals with the skills and knowledge required to apply knowledge of mechanical service technology to building construction applications.

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Investigate transportation systems in medium and high – rise buildings	1.1	Transportation systems for goods and people in buildings are described.
		1.2	The components of a lift system and an escalator system are described.
		1.3	The functions of a lift system and an escalator system are explained.
		1.4	The factors affecting the integration of lifts and escalators in buildings are described.
2.	Investigate piped services in medium-rise buildings	2.1	Types of piped services in specified building(s) are correctly described.
		2.2	The purposes of components for water services are explained.
		2.3	The factors affecting the integration of piped services in the building(s) are described.
3.	Investigate ducted services in medium –rise office blocks	3.1	Ducted services in a specified building are described.
		3.2	The functions of components for ventilation systems are explained.
		3.3	The purposes of components for air conditioning systems are explained.
		3.4	The factors affecting the integration of ducted services in a building are described.
		3.5	The requirement of a mechanical ventilation system for kitchen and toilet accommodation in a specified building is determined from given information.

- | | | | |
|----|--|-----|---|
| | | 3.6 | The requirement of an air conditioning system for a specified building is determined from given information. |
| 4. | Examine sanitation and drainage systems | 4.1 | Water services systems in complex buildings and their external works are described. |
| | | 4.2 | The selection criteria for sanitary appliances and the arrangement of associated discharge pipe work are justified. |
| | | 4.3 | The arrangement of foul and surface water drainage system are explained and nominal sizes calculated. |
| | | 4.4 | Requirements for on-site surface water and foul water treatment are described. |
| 5. | Examine natural and mechanical ventilation systems | 5.1 | Requirement for ventilation of complex buildings are identified. |
| | | 5.2 | Arrangements and components for natural ventilation systems are examined. |
| | | 5.3 | Types of mechanical ventilation systems are described and selected for given enclosures. |
| | | 5.4 | Arrangement and sizing of ventilation ducts are described. |
| 6. | Examine air conditioning systems | 6.1 | The use of psychometric data in the design of air conditioning systems is explained. |
| | | 6.2 | Air conditioning systems components and their functions are described. |
| | | 6.3 | Types of air conditioning system are compared for suitability for given enclosures. |
| | | 6.4 | The impact of air conditioning systems on the design and construction of buildings is described. |

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Transportation systems:

- lifts
- escalators
- paternosters
- travolators

Components of lifts:

- lift shaft
- lift pit
- lift car
- hydraulic unit
- lifting gear
- braking system
- lift room

Functions of lift system:

- carriage (people, goods)
- control (call, start, stop)
- enclosure (safety)

Escalators system:

- single back
- parallel
- criss-cross

Factors affecting the integration of lifts and escalators in buildings:

- cost
- construction (walls, floors, ceilings)
- loading
- access
- egress
- maintenance
- fire prevention
- safety
- structural stability
- acoustic control
- sound attenuation

Buildings:

- medium-rise (retail outlet)
- high-rise (office block)
- medium-rise blocks of flats

Components of escalators:

- electric motors
- moving stairway
- electrical control (emergency stop, overload provision, override)
- access pit
- fire curtain

Lifts:

- electric (traction drive, drum)
- hydraulic drive

Functions of escalator system:

- carriage (people, goods)
- control (start, stop)

Piped services:

- water supply and distribution (cold, hot)
- drainage (surface water, foul water)
- ventilation
- air conditioning
- sanitation (solid, liquid)

Purpose of air conditioning components:

- control of air (movement, purity, temperature)

Purpose of components for water service:

- economy
- comfort
- safety
- distribution
- storage
- maintenance

Factors affecting integration of piped services in the building(s):

- cost
- safety
- construction materials (walls, floors, ceiling)
- loading
- maintenance
- legislation (water supply bylaws)

Ducted services:

- mechanical ventilation
- air conditioning
- single duct re-circulated air system

External works for sanitation and drainage systems:

- back inlet gullies
- inspection chambers
- drainage pipes
- man-holes

Air conditioning and ventilation components:

- duct-work
- filters
- fans
- pre-heater humidifiers
- cooling coil
- after heaters
- humidistat
- thermostat
- humidifiers
- temperature thermostat
- dampers
- registers
- control box
- motorised valve

Water services systems:

- types (gravity, pumped)
- purpose (hot and cold supply)
- primary and secondary circulation
- drinking water

Components of water services:

- storage cistern
- pipe work
- system controls (temperature, pressure)
- valves (gate, butterfly, float operated)
- reflex (drain-down)

Ventilation systems:

- mechanical inlet and natural extract
- natural extract and mechanical inlet
- mechanical inlet and mechanical extract

Complex buildings:

- home for the age & the disabled
- hotel with range of facilities
- department stores with food sales and cooking and dining facilities

Air conditioning systems:

- high pressure
- medium pressure
- low pressure
- stand alone packages
- central plant
- zoned system
- dual duct system
- perimeter induction
- variable air volume
- fan coil

Sanitary appliances:

- sinks
- baths
- showers
- WCs
- bidets
- urinals
- wash-down areas
- circulation for disabled (toilets, wash-down)
- communal showers and wash basin (leisure complexes)
- controls (valves, zoning for shut-down, maintenance access, security against pollution)

Suitability air conditioning system:

- function
- capacity
- controllability
- cost

Selection criteria:

- pipe sizes
- jointing
- type of traps
- venting
- falls

Psychometric data:

- cooling
- heating
- humidification cycles
- dehumidification cycles

Impact on design of building:

- provision of space in terms of suspended
- ceilings
- horizontal service duct
- vertical service ducts
- problems of down stand beams (change of cross-section for ducts-versus holes in deep beams) supporting the plant room (effect on columns, walls and beams) effects on overall building height

Functions of air conditioning system components:

- positions within systems
- control mechanisms
- accessibility for maintenance

Arrangements of associated discharge pipe work:

- ventilation
- traps
- seals
- materials selection (fixing, jointing, repair)

Arrangements for natural ventilation system:

- influence of wind and thermal forces
- location on inlets
- location of outlets
- layout design to control air changes

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- identification of transportation systems used in medium and high-rise buildings
- investigative report of piped services for medium-rise buildings, advantages and limitations
- identification of sanitary conveniences requirements for low-rise and medium-rise buildings
- identification of types of air condition systems and requirements for low-rise and medium-rise buildings

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- types of transportation systems in buildings
- principles of operation of transportation systems in building
- factors to consider in the installation of transportation in buildings
- types, advantages and limitations of piped services in buildings
- types of air conditioning systems
- selection criteria for air conditioning
- air condition system components and application
- sanitary requirements and components

Skill

The ability to:

- read and interpret technical materials and specifications of mechanical services for building
- research requirements of mechanical services for low-rise domestic and commercial buildings
- prepare technical reports

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

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Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGBCD0163A: Apply knowledge of planning the physical environment

Competency Descriptor:

This unit deals with the skills and knowledge required to apply the knowledge of planning the physical environment of construction application

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Investigate the legislation and the process of development control relating to town and country planning	1.1 The need for controlling development is explained.
	1.2 The legislative framework of town and country planning is described.
	1.3 The control of development is described.
	1.4 Methods of public consultation on planning matters are described.
2. Investigate town and country planning policy	2.1 The legislative framework for town and country planning for a local area is described.
	2.2 The function and responsibilities or organisation involved in local area planning are described.
	2.3 The results of planning policies within the last twenty years related to residential development in a given local area are explained.
	2.4 The influence or pressure groups in the formulation of planning policy for a local area are described.
3. Investigate policy affecting infrastructure	3.1 The relationship between the planning policy and the infrastructure required is described.
	3.2 The requirements for urban and rural road networks are described.
	3.3 The requirement for public services is described.
	3.4 Functions or organisations involved in the infrastructure within the urban and rural environment are described.

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Need for controlling development:

- public health problems
- housing problems
- transport
- urban growth
- industrial patterns (growth, decline)
- conservation
- environmental control (pollution, derelict land, mineral working, clean air, noise)
- preservation (buildings, trees, woodlands)
- leisure (coastline, rights of way, National Parks)
- slum clearance and improvement
- squatting/informal settling

Legislative framework:

- Town and Country Planning Regulations
- environmental protection regulations
- Urban Development Corporation
- Ministry of Housing
- Local Parish Council

Function and responsibilities or organisation involved in planning:

- Central Government Agencies - approval plans, policy guidelines, public inquiries
- Parish Councils - development control, compulsory purchase of land, policy guidelines, appeals, enforcement

Function of organisations involved in the infrastructure within the urban and rural environment:

- utility services
- essential services
- safety
- amenities

Control of development include:

- land use classes order
- development order (permitted development)
- conditional permissions
- enforcement
- revocation
- modification
- discontinuance
- development undertaken (government departments, local authorities, statutory undertakers)
- compulsory purchase orders

Development work include:

- new construction work (building, civil engineering)
- renovations
- mining quarrying
- change of use

Methods of public consultation:

- notices
- exhibitions
- public inquiries

Organisations involved in planning include:

- National Environment Planning Agency (NEPA)
- Parish Councils

Results of country planning policies:

- permitted development
- open spaces
- green belts
- infrastructure
- employment and the economy
- environmental protection and enhancement
- housing provision
- transport
- nature reserves and natural parks
- footpaths and bridleways
- forestry
- rivers and canals

Infrastructure includes:

- roads
- communications
- services
- public services
- built environment

Results of policy affecting infrastructure:

- communication networks
- financial
- conservation
- environmental control
- urban development
- urban regeneration

Organisations involved in the infrastructure within the urban and rural environment include:

- Public Works Department
- National Water Commission
- Jamaica Public Service
- National Housing Trust
- Operation Pride
- Ministry of Health
- Fire Department

Urban and rural road networks:

- roads (trunk roads, minor roads, estate roads, bypasses)
- funding (capital revenue)
- construction (need, delay, cost benefit analysis, disruption)

Requirements for public services:

- waterworks
- distribution pipe work
- reservoirs
- dams
- water towers
- cost (revenue, capital)

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- identification and description of legislation applicable to the planning of physical environment
- identification and description of function of agencies involved in physical planning
- description of framework and implementation process of planning procedures
- report on investigation carried out on survey of the categorisation of land

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- reasons for planning legislation for physical environment
- town and planning legislation
- main planning authorities and their responsibilities
- agencies involved physical environmental planning
- areas of control relating to town planning
- types of development plan
- procedures for permitting development
- planning enforcement penalties
- procedure for appealing rejection
- classification of land use and schemes used in classification

Skill

The ability to:

- explain need for controlling development
- explain Town and Planning Regulation
- identify and explain the functions of agencies involved in planning
- Identify and explain the methods of public consultation on physical planning
- Identify effects of the country planning policies
- Identify types of Infrastructure

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 2	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 1	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGCDP0173A: Demonstrate knowledge of resource management

Competency Descriptor:

This unit deals with the skills and knowledge required to apply knowledge of resource management to building and construction application

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Investigate project planning	1.1 Contracts for the construction industry are described. 1.2 Purposes of project planning for construction work are explained. 1.3 Project planning procedures for construction work are described. 1.4 Causes of change to project planning are described. 1.5 Effects of accommodating change to project planning on the construction.
2. Plan and organize construction work	2.1 Budgetary control methods for construction work are demonstrated. 2.2 Work-study techniques for construction work are demonstrated. 2.3 Method statements for planning construction work are produced. 2.4 Methods of programming for organising construction work are demonstrated. 2.5 Mathematical techniques are used to calculate resource requirements.
3. Describe processes for managing resource and safety requirements for construction	3.1 Processes for managing materials requirements for individual stages of construction work are described. 3.2 Processes for managing plant requirements for individual stages of construction work are described. 3.3 Processes for managing labour requirements for individual stages of construction work are described.

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| | 3.4 | Processes for managing safety requirements for construction work are described. |
| 4. | 4.1 | Describe the monitoring of construction work during the contract period
Methods of monitoring the progress of construction work during the contract period are described. |
| | 4.2 | Labour control methods for construction work are described. |
| | 4.3 | Plant control methods for construction work are described. |
| | 4.4 | Materials control methods for construction work are described. |

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Project planning procedures include:

- organisation structure
- site layout planning
- requirement schedules
- meetings
- placing of orders for subcontractors and suppliers
- master programme

Contracts include:

- common law
- essentials of a valid contract
- construction contracts (JCC, ICE)
- contract documents (contract drawings, Bills of Quantities, specifications, articles of agreement)

Causes of change to project planning:

- weather
- changes in design
- late delivery of materials by subcontractors
- industrial relations

Effects of accommodating change to project planning:

- extensions of time
- liquidated damages
- revised master programme

Resource requirements:

- materials (e.g. concrete, steel, cladding, road construction materials)
- plant (e.g. excavator, lorry, crane, concrete mixer)
- labour (e.g. site staff, craft operatives, general operatives)

Mathematical techniques:

- arithmetical (addition, subtraction, multiplication, division, ratios, proportions, percentage calculations for interest and depreciation)
- graphical (x axis, linear, bar charts, pie charts)
- use of calculators

Methods of programming for organising construction work include:

- bar charts
- Gantt charts
- network diagrams
- critical path analysis
- line of balance
- short-term balance
- weekly balance

Construction work:

- substructure
- superstructure
- estate road

Work study techniques for construction work:

- method study (process chart, flow diagram, activity sampling)
- work measurement (timing, rating, contingencies, normalising allowances)

Method statement for planning construction work:

- work stages
- quantity of work
- methods of construction
- sequence of operations
- plant outputs
- duration

Processes for monitoring materials requirements:

- documentation
- waste control
- ordering
- storing
- security
- scheduling

Budgetary control methods:

- budget graphs
- unit costs
- actual costs
- anticipated costs
- cash flow
- expenditure
- revenue

Purposes of project planning:

- maximising costs
- completion within time to budget according to contract

Safety requirements:

- Building regulations
- Factories Act

Methods of monitoring progress:

- site meetings
- site diary
- weekly plan of work
- programme
- update

Labour control methods:

- time sheets
- work study
- method study
- daily labour allocation
- supervision

Plant control methods:

- time sheets
- utilisation factors
- operation sheets
- schedules
- work study
- method study

Processes for monitoring for plant requirements:

- hire/buy
- use
- maintenance
- output
- matching cost per hour

Material control methods:

- stock control
- delivery notes
- invoices
- orders
- statements
- wastage and loss
- storage

Processes for monitoring safety requirements:

- prescribed notices
- registers
- safety officer
- training
- provision of personal protective equipment

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- demonstrated knowledge of types of contracts for building and construction and their applications
- demonstrated knowledge of the procedure for planning a construction work project
- demonstrated knowledge of causes and effect of change to project planning
- description of the processes for planning and organising a construction work
- description of the process and method to monitor construction work during the contract period
- demonstrated ability to communicate to client all project considerations, particularly those affected by legal, statutory and financial restraints
- evidence is best gathered through a holistic assessment activity, which integrates the elements of competency

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- project management principles and their application
- quality management principles
- organisation and legislative requirements
- resource management
- organisational policies and guidelines
- planning and control processes
- project review procedures
- performance evaluation
- business planning
- understanding of the abilities and capabilities of work team
- safe work practices

Skill

The ability to:

- verbal and written communication
- planning and scheduling of monitoring activities
- contractual management
- computer skills
- time management
- financial planning
- communication
- negotiation
- project evaluation

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment. If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- a real or simulated environment
- a project plan
- a range of people, equipment and resources, locations or sites
- organisation policies and guidelines
- relevant legal and statutory documentation

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority or client.

(6) Context of Assessment

Evidence may be gathered in a real or simulated environment on or off the job or by examination of a portfolio. Portfolio could include examples of work, client reports or management reports.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGBCD0183A: Develop civil engineering drawings

Competency Descriptor:

This unit deals with the skills and knowledge required to develop drawings for civil engineering construction.

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Produce site layout drawings for civil engineering construction work	1.1 Cross sections of civil engineering sites are drawn showing variations of level established from given survey information. 1.2 Site layouts plans are drawn to locate permanent construction item to main grids. 1.3 Site layout sections are drawn to locate datum levels of permanent construction items.
2. Produce general arrangement (g.a) drawings for civil engineering construction work	2.1 Requirements for g.a drawings, based on given design information are agreed with the designer. 2.2 General arrangement drawings for external works are drawn in plan and cross section. 2.3 General arrangement drawings for foundations and ground works to buildings are drawn in plan. 2.4 General arrangement drawings for superstructures of buildings are drawn in plan. 2.5 General arrangement drawings for foundations, ground works and superstructures of buildings are drawn in cross section.
3. Produce outline drawings of external works that provide dimensions and technical information for their construction	3.1 Cross-sections of estate roads are drawn showing provision for surface water drainage. 3.2 Cross-sections of retaining walls are drawn showing provision against ground water build-up. 3.3 Cross-sections and longitudinal sections of small span bridges and their abutments are drawn showing provision for thermal movement.

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|----|---|-----|---|
| 4. | Produce outline drawings of insitu reinforced concrete building elements for shuttering information | 4.1 | Cross-section of walls and columns are drawn showing special features. |
| | | 4.2 | Elevations of walls are drawn showing details of openings inserts for services. |
| | | 4.3 | Beam elevations and cross-sections are drawn showing special provisions. |
| | | 4.4 | Longitudinal sections of and landings are drawn. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Permanent construction items:

- roadwork's (new roads, small span bridges, off-road parking provision, levels)
- earthworks (retaining walls, embankments, cuttings, soft landscaping)
- drainage works (surface water drainage, drain runs, gullies, soak ways, sand drains, foul water drainage, inspection chambers, manholes, invert levels, connections to sewers)
- building works (outlines of buildings, references to main grid, ground slab levels)

Survey information includes:

- existing works (site boundaries, roads, drainage systems, streams, open culverts, closed culverts)
- utilities (gas, water electricity, telecommunication supplies)
- level references (spot heights, invert levels of manholes, inspection chambers culverts)

Requirements for general arrangement drawings (g.a.):

- number of g.a. drawings needed to provide adequate information to contractors
- scales to be used
- main grids
- structural grids for walls
- structural grids for columns of buildings
- datum level

Design information:

- dimensions (foundations, beams, columns, thickness of walls, thickness of slabs, stair flight waists, half landings, pitch of stair flights, storey heights)
- levels (positions of upper floors, structural levels derived from floor finishes)

Foundation types:

- isolated
- combined
- tie beams
- ground beams
- rafts

Superstructures include:

- steel framed buildings
- pre-cast concrete buildings
- insitu reinforced concrete
- composite construction

Estate roads:

- rigid
- semi-rigid
- flexible
- specification (materials, width of carriageway, thickness)

Provision against groundwater build-up:

- drainage and rubble fill on earth side of wall
- no-fines blocks or rubble fill on earth face
- weep holes through to the exposed face
- drainage channels to gullies

External works include:

- road works (roads, small span bridges, parking areas)
- earthworks (retaining walls, culverts, cutting ramps)

Groundwork includes:

- basements
- oversite concrete
- ground slabs
- service ducts

Retaining walls:

- mass (masonry, concrete)
- cantilevered insitu reinforced concrete
- facings
- finishes

Details of openings inserts for services:

- shapes of openings
- dimensions of openings
- lengths of inserts for fixings
- wall dimensions

Special provisions for beam elevations and cross-sections drawings:

- service holes (location, dimensions)
- intersections with slabs
- intersections with columns
- changes in profile
- dimensions

Special features of walls and columns:

- use of permanent formwork
- chamfered corners
- inserts for fixings cost
- insitu; dimensions

Stair flights:

- straight
- dogleg
- cantilever with spine beam or wall supports
- provision for change of finishes between stair and landings
- dimensions

Stair flight landings:

- half landings in stair wells
- landings to main floors
- cantilevered landings from spine beams or walls

Bridges:

- road traffic (latticed truss steel with timber decking)

Types of civil engineering site:

- small,
- at fixed locations from grids

Bridges abutment:

- bearings
- surface treatments
- expansions joints sealants

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- Compliance with occupational health and safety regulations applicable to workplace operations.
- Application of organisational management policies and procedures including quality assurance requirements where applicable.
- Practice safety techniques appropriate to computer usage.
- Demonstrate basic computer skills.
- Set drawing parameters.
- Civil construction site layout drawing.
- General arrangement (g.a) drawing.
- Outline drawings of external works.
- Outline drawings of insitu reinforced concrete.
- Communication with people of different levels of responsibility.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- processes for the interpretation of reports, working drawings and specifications
- drafting and drawing protocols
- relevant national, statutory legislation and local government policy and procedures
- structural, design and construction principles of buildings
- terminology, definitions and fault identification
- codes of conduct and ethics
- research methods
- processes for the administration and preparation of documentation
- types and characteristics of civil engineering site
- survey information types and their importance
- items considered permanent construction and the functions
- general arrangement drawings (g.a.) requirements
- design information for drawings
- foundation types, advantages and limitations
- provision against groundwater build-up

Skill

The ability to:

- research, analyse, organise and understand the application and production of civil engineering drawings
- communicate ideas and information to translate specifications enabling production of drawings for civil engineering
- plan and organise activities including the planning of working drawings for civil engineering and analytical processes related to civil construction
- work with others and in a team by recognising dependencies and using co-operative approaches to optimise satisfaction and productivity
- establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage
- use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, scales and numbering systems, quantify, survey and present analytical results
- use workplace technology related to information gathering and analysis, diagnosis, information research, report writing, production of working drawings, administration and management procedures

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGBCD0193A: Apply knowledge of civil engineering constructions

Competency Descriptor:

This unit deals with the skills and knowledge required to apply the knowledge of civil construction to building and construction applications

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Describe the scope and impact of civil engineering	1.1 The role of the civil engineer is described.
	1.2 The range of civil engineering works is described.
	1.3 The impact of civil engineering works on the environment is described.
	1.4 The types of structures associated with civil engineering works are described.
	1.5 The materials used in civil engineering structures are described.
2. Investigate the range and function of ground works, earth embankments and foundations	2.1 The range and the function of ground works are described.
	2.2 Methods and equipment for geotechnical investigation are described.
	2.3 The construction of earth embankments is described.
	2.4 Ground bearing capacity improvement techniques is identified.
	2.5 Methods of drainage for excavations and earth embankments are explained.
	2.6 Functions of foundations are explained.
	2.7 Suitable foundations for building structures are selected from secondary sources.

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| 3. | Investigate the construction of external civil works | 3.1 | The types of external civil works are identified. |
| | | 3.2 | The types of plant and their function in the construction of external works are described. |
| | | 3.3 | The system of road classifications is described. |
| | | 3.4 | Factors affecting road route planning are described. |
| | | 3.5 | Factors affecting design of highways are explained. |
| | | 3.6 | Materials used for highway construction are described. |
| | | 3.7 | Types of bridge structure are described. |
| | | 3.8 | Factors which influences the design of retaining walls is assessed from given data. |
| | | 3.9 | Factors which influences the design of airfield are described |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Range of civil engineering works:

- buildings
- ground works
- highways
- bridges
- culverts
- dams
- coastal/marine works
- airports
- transportation systems
- mines
- utility works (e.g. water, sewage)
- tunnelling
- land reclamation

Machine/equipment types:

- bulldozers
- backacters
- scrapers
- scarifiers
- cranes
- concrete pumps
- vibrators
- rollers
- dumpers
- concrete mixers
- road laying equipment

Machine/equipment function:

- earth moving
- lifting
- carrying
- mixing
- preparing (e.g. surfaces)
- compacting
- finishing

Impacts of civil engineering works on the environment:

- pollution
- aesthetics
- depletion of natural resources

Methods of geotechnical investigation:

- desk studies
- bore holes
- trial pits
- plate tests
- penetrometer tests
- chemical analysis
- CBR test

Materials used in civil engineering structures:

- concrete (mass, reinforced)
- steel
- masonry
- timber

Types of external works:

- bridges
- highways
- culverts
- airfields
- subways
- retaining structures

Road classification:

- motorway
- trunk roads
- distributor roads
- residential roads with and without footways

Role of the civil engineer:

- planning new developments
- studying the feasibility of schemes
- investigating the conditions on site
- detailed design
- supervising the contractors on site
- financial administrative control

Types of structures associated with civil engineering:

- frame
- box
- retaining (temporary, permanent)

Function of ground works:

- ground water control
- ground compaction
- ground consolidation
- ground drainage
- erosion control
- ground stability

Embankments:

- layered (e.g. reinforced with geotextiles)
- trestle
- gabion
- fascines

Equipment for geotechnical investigation:

- penetrometer
- auger
- mechanical excavators
- hand excavators
- percussion

Factors affecting design of highways:

- traffic flow
- strength of formation
- highway design guides (e.g DPT requirements)

Environment:

- urban
- rural

Range and the function of ground works:

- excavation (cuttings, foundations, basements)
- cut and fill operations

Factors affecting road route planning:

- cost
- amenity factors
- geological
- topographical,
- major “pinch points”
- location of utilities
- vertical alignment
- horizontal alignment
- impaction properties
- conservation areas
- sites of special scientific interest
- archaeological sites

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- demonstrated broad understanding of civil engineering structures and work
- description of the range and impact of civil engineering work
- demonstrated knowledge of the range and function of ground-water works, earth embankment and foundations
- demonstrated knowledge of the types and function of civil engineering works

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- the role of civil engineers and the range of engineering works
- types of civil engineering structures and materials used in construction
- ground bearing capacity
- geotechnical investigation
- methods of drainage for excavation and earth embankment
- suitability of foundation for building structures
- types and nature of external civil construction works
- machines and equipment for external civil construction work

Skill

The ability to:

- describe the scope and impact of civil engineering
- investigate the range and function of ground works, earth embankment and foundation
- investigate the construction of external works

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data.

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGBCD0203A: Demonstrate knowledge of building services systems

Competency Descriptor:

This unit deals with the skills and knowledge required to apply the knowledge of building service systems to construction application

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Examine the requirements for the supply of cold and hot water in low-rise commercial buildings	1.1	Requirements for cold water supply systems are explained.
		1.2	Requirements for hot water supply systems are explained.
		1.3	Schematic drawings for cold and hot water services systems are produced for a given low-rise commercial building.
2.	Examine and justify a suitable ventilation and simple air conditioning system for a low-rise commercial building	2.1	The selection of a suitable ventilation system for a given low-rise commercial building is justified.
		2.2	The selection of a suitable simple air conditioning system for a given low-rise commercial building is justified.
		2.3	Materials and components required for the selected ventilation and air conditioning systems are identified.
3.	Examine the requirements for the provision of electrical supply systems in low rise commercial buildings	3.1	The functional requirements and design requirements of electrical supply systems in low-rise commercial buildings are described.
		3.2	The design and installation of communication systems are described.
		3.3	Schematic layouts of the electrical supply systems and communication system are produced for a given low-rise commercial building.

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|----|---|-----|---|
| 4. | Examine the requirements for the installation, operation and maintenance of services plant and equipment in low rise commercial buildings | 4.1 | Provision of plant and associated equipment required for the installation of cold and hot water supply systems in low rise commercial building is described |
| | | 4.2 | Provision for plant and associated equipment required for the installation of mechanical ventilation and simple air conditioning system is described. |
| | | 4.3 | The need for provision of on-site electrical substations and control rooms to support electrical supply systems is assessed. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Requirements for cold water supply systems:

- byelaws
- capacity of building

Hot water supply system:

- direct
- indirect
- storage
- distribution
- plant sizing
- pipe work sizing
- materials
- components

Provision of plant and associated equipment:

- storage vessels controls for maintenance
- controls for replacement
- access to equipment
- safety (risks of contamination, requirements of water byelaws)
- access (maintenance, cleaning, inspection)
- loading imposed on the structure of the building

Requirements for hot water supply systems:

- energy load
- energy conservation

Cold water supply system:

- mains
- storage
- distribution
- equipment sizing
- pipe work sizing
- materials
- components

Design requirements of electrical supply systems:

- capacity of system
- facilities for maintenance
- facilities for repair
- facilities for replacement
- facilities for expansion
- safety considerations for the user
- layout sketches and drawings

Ventilation systems:

- mechanical extract and natural input
- mechanical input and natural extract
- mechanical extract and mechanical input
- independent fans
- ducting arrangements

Materials and components required include:

- ducts
- fans
- attenuators
- dampers
- filters
- cooling batteries
- heating batteries
- humidifiers
- insulation
- support fixings
- hangers
- brackets

Communication systems:

- telephone
- facsimile
- radio
- cable and satellite systems
- paging systems
- computer networks

Schematic drawings:

- Isometric layouts (hot water system, cold water system, location of components, identification of components, location of controls)
- conventions (standard methods, systems)

Air conditioning systems:

- central station
- packed systems

Communication design:

- location
- system separation
- ease of access
- security of systems

Selection criteria for mechanical ventilation systems:

- considerations of volume of air to be moved
- number of times per hour
- statutory ventilation requirements
- energy implications

Electrical supply systems:

- circuits (distributions networks, lighting sub circuits, power sub circuits, control sub circuits)
- components (distribution controls, circuit controls, sub circuit controls related to other service systems)

Communication installation:

- cable trays
- trucking
- ease of identification
- access for maintenance
- access for repair

Functional requirements of electrical supply systems:

- practical installation considerations (e.g. safety for the installer)
- JS21 regulations

Selection criteria for air conditioning systems:

- psychometric data application of vapour compression systems of refrigeration

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- read and interpret drawings and specifications
- identification of requirements for cold water and hot water supply systems
- the provision made for plant and associated equipment required for cold and hot water supply systems in low-rise commercial building
- the provision made for plant and associated equipment required for the installation of mechanical ventilation system
- the provision made for plant and associated equipment required for the installation of simple air conditioning system
- identification of required materials and components
- assessment of the need to provide on-site electrical substations and control rooms to support electrical supply systems

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- requirements for cold water supply systems installation: byelaws, capacity of building, energy load, energy conservation
- ventilation systems and operating principles
- air conditioning systems and operating principles
- electrical supply systems and components
- types and characteristics of materials and components required
- communication systems, operations and installation requirements

Skill

The ability to:

- Identify cold and hot water systems requirement
- read and interpret schematic drawings
- Identify ventilation and air conditioning requirements for low rise residential building
- Identify communication types and principles of operation
- Identify materials requirements for ventilation, electrical, air conditioning, communication and water systems

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data.

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> • Carries out established processes • Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> • Manages process • Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> • Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGBCD0213A: Demonstrate knowledge of building services controls

Competency Descriptor:

This unit deals with the skills and knowledge required to a working knowledge of building service control in building and construction application

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Examine the applications of instrumentation to the controls of building services installations	1.1 Components needed to meet statutory and operational requirements for the control of building services installations are identified. 1.2 Factors involved in the selection of instrumentation for the control of building services installations are described. 1.3 Components for a proposed services installation are assessed for their suitability for use.
2. Evaluate the structural performance or recently constructed buildings	2.1 The structural forms of assembly for low-rise domestic buildings are assessed for structural performance. 2.2 The structural forms of assembly of low-rise commercial buildings are assessed for structural performance. 2.3 Provision for building services installations in low-rise commercial buildings, as part of the structural design, is explained. 2.4 Quality control and dimensional control during construction are explained and an assessment made their effectiveness in terms of the finished product.
3. Evaluate the functional performance of recently constructed buildings	3.1 The external envelopes of domestic and commercial buildings are assessed for functional performance. 3.2 The internal environments of domestic and commercial buildings are assessed for effective performance. 3.3 The external and internal fabrics of domestic and commercial buildings are assessed for durability.

- | | | | |
|----|---|-----|--|
| 4. | Evaluate the physical condition of an old building and assess its suitability for refurbishment and possible modification for change of use | 4.1 | The physical condition of an old building is described. |
| | | 4.2 | Structure repairs that might be needed, to bring the building back into use, are identified. |
| | | 4.3 | Repairs to finishing's and components, and possible modifications that might be needed are identified. |
| | | 4.4 | Forms of legislation and control, connected with the refurbishment and modification of old buildings are identified. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Operational requirements:

- occupant safety
- user comfort
- energy efficiency
- security

Statutory requirements:

- building regulations
- health and safety regulations

Components to meet statutory and operational requirements:

- pressure sensors
- level sensors
- flow sensors
- temperature sensors
- humidity sensors

Selection factors of instrumentation:

- temperature (flow, room, duct, outside air, flame)
- systems (signal conditioning, mechanical systems, electrical systems, pneumatic systems, static and dynamic response of first and second order systems)

Low-rise domestic buildings:

- house (e.g. detached, semi-detached, townhouses terraced)
- flats and maisonettes (e.g. combined or separate)

Suitability for refurbishment of old building:

- layout
- cost
- function

Structural forms of low-rise domestic buildings:

- cellular (e.g. block with timber floors, timber framed)
- cross wall (e.g. block with timber floors or concrete floors)
- flat roofs
- pitched roofs (e.g. joists, trusses, trussed rafters)

External envelope:

- ground floor
- walls
- windows
- doors
- claddings
- roofing
- roof lights
- cladding

Internal environment:

- lighting
- acoustics
- ventilation
- safety against fire

Old building types:

- traditionally built housing (e.g. brick purlin and rafter roof, clay tiles)
- eighty years or more old
- spread footings
- suspended timber ground floor

Structural repairs include:

- walls (e.g. underpinning, shoring, mortar joints, damp courses)
- floors (e.g. replacement of some joists, boarding, eradication of rot)
- roofing (e.g. replacement of roof members, use of trussed rafters, wall plates)
- strengthening to take increased loads

Low-rise commercial buildings:

- shops
- offices
- combination (e.g. shops with living or office accommodation)

Structural forms of low-rise commercial buildings:

- cross wall (e.g. block with concrete floors, concrete walls and concrete floors)
- framed (e.g. insitu reinforced concrete frame with one way spanning floors)
- flat roofs
- pitched roofs

Functional performance:

- exclusion of groundwater
- exclusion of rain water (e.g. through walls, windows, pitched roofs, flat roofs)

Physical condition of old building includes:

- state of foundations, walls, floors, roof, doors, windows, stairs (e.g. of movement, verticality, level, bearing for joists and rafters, wet rot, dry rot)

Finishing and components:

- external (e.g. replacement of some brickwork, matching in, pointing, replacement of windows and doors, replacement and possible re-use of some roof tiles)
- internal (e.g. new sanitary ware, kitchens, pipe work, doors and thresholds, finishes, electrical wiring, fire compartmenting)

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- components for the control of building services installations
- statutory and operational requirements for control of building services installations
- factors involved in the selection of instrumentation for the control of building services installations
- quality control and dimensional control during construction
- low-rise domestic buildings
- low-rise commercial buildings
- structural forms of low-rise domestic buildings
- structural forms of low-rise commercial buildings
- external envelope and internal environment

Skill

The ability to:

- identify components required for the control of building services installations
- explain statutory requirements for control of building services installations
- identify quality and dimensional controls for services installations
- determine structural repair requirements for old buildings

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data.

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> • Carries out established processes • Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> • Manages process • Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> • Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGBCD0223A: Demonstrate knowledge of built environment and the community

Competency Descriptor:

This unit deals with the skills and knowledge required to apply knowledge of the built environment and the community to construction application

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Investigate the effect of the natural environment on the built environment	1.1	Features of the natural environment are described.
		1.2	Features of the built environment are described.
		1.3	The effect of the natural environment on the built environment in a locality is explained.
2.	Explore constraints on the development of low-rise buildings	2.1	Technical constraints on the development of low-rise buildings are described.
		2.2	Social constraints on the development are described.
		2.3	Financial constraints on the development are described.
		2.4	Legal constraints on the development are described.
		2.5	The constraints are analyzed for a given low-rise building.
3.	Investigate the environmental impact of construction work	3.1	Types and sources of pollution resulting from construction work are identified.
		3.2	The impact on the environment of pollution resulting from construction work is described.
		3.3	Methods of obtaining materials for construction work are assessed for their impact on the environment.
		3.4	Reasons for protecting the environment are explained.
		3.5	Methods of protecting the environment are described.

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Features of the built environment include:

- communities (cities, towns, villages)
- zones of use (residential, commercial, industrial, leisure)
- communications (road works, rail networks, sea networks, air networks)
- infrastructure (bridges, roads, dams, power stations, transmission lines, pipelines)

Effects of the natural environment on the built environment:

- siting of communities
- location of zones of use
- position of communications
- construction of infrastructure

Social constraints on the development:

- height
- size
- colour
- material
- aesthetics
- access
- services
- use of building complements existing built environment

The impact on the environment:

- aesthetics
- water table
- residents

Features of the natural environment include:

- topography (e.g. mountains, hills, valleys, rivers, coastline)
- climate (e.g. wind, rain, sunshine, seasonal temperature)
- geology (e.g. mineral bearing strata, rock types, soil cover)

Technical constraints on the development of low-rise buildings:

- building on soil types (rock, clay, sand, chalk)
- aspect and location (e.g. daylight, air movement between buildings, ventilation)

Financial constraints on the development:

- sources of funding (financial institutions, central government)
- costs (land costs, building costs, interest rates)
- profit margins

Construction work:

- low-rise residential development
- associated external works

Methods of obtaining materials:

- moving
- quarrying
- cutting
- blasting
- drilling
- logging
- recycling

Sources of pollution:

- storage of materials
- transportation of materials
- processing of materials
- use of plant
- demolition

Methods of protecting the environment include:

- (a) Legislation- (e.g.)
 - environmental protection regulations
 - Town and Country planning Act
 - water resources regulations
- (b) organisations- (e.g.)
 - environmental health planning authorities
 - National Conservation Resource

Materials:

- clay
- stone
- sand
- gravel
- timber

Types of pollution:

- noise
- demolition waste
- dust
- fumes
- spillage (building materials, plant fuel, hazardous chemicals)

Legal constraints on the development:

- controls (building controls, planning controls)
- contracts (solicitors, consultants, contractors)

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- Compliance with occupational health and safety regulations applicable to workplace operations.
- Application of organisational management policies and procedures including quality assurance requirements where applicable.
- Identification of features of the natural and built environment.
- Description of constraints on the development of low-rise buildings.
- Report of investigation on the environmental impact of construction work.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- features of the natural and built environment
- effect of the natural environment on the built environment
- constraints on the development of the built environment and their impact
- materials used in the built environment
- reasons for protecting the environment
- methods of protecting the environment

Skill

The ability to:

- identify features of the natural environment and built environment
- identify types of constraints on the development of low-rise buildings
- identify methods of protecting the environment

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> • Carries out established processes • Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> • Manages process • Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> • Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCGBCD0233A: Apply knowledge of cartography and measured surveys

Competency Descriptor:

This unit deals with the skills and knowledge required to apply the knowledge of cartography and measured surveys to building and construction application

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Examine maps and interpret information for development purposes	1.1 Basic knowledge of triangulation and national co-ordinate system used by the Survey Department is described and demonstrated.
	1.2 Types of maps and their common scales appropriate to the development purpose are identified.
	1.3 Natural and built features are identified from conventional symbols on a map.
	1.4 Co-ordinate and map references are determined from supplied maps to locate natural and built features relevant to a development purpose.
	1.5 Co-ordinate and map references are determined from supplied maps to locate natural and built features relevant to a development purpose.
	1.6 Information required determining the suitability of a site for the development purpose is extracted from a supplied map.
	1.7 Purpose of a topographical survey is identified.
	1.8 Linear and angular measurements for land surveying are described.
	1.9 Presentations of measurements made in land surveying are identified.
	1.10 Uses of contour maps are described.
2. Undertake a measured survey	2.1 The purpose of a measured survey for building is described.
	2.2 Methods and equipment for recording dimensions and features of a building are described.

- 2.3 Equipment is selected and a measured survey is undertaken.
- 2.4 Checks for the dimensional control of buildings are carried out.
- 2.5 Accurate drawings are produced to current standards based on data from the survey.
- 2.6 A fabric condition report is prepared from survey information collected.

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Types of maps include:

- 1:1250, 1:2500)
- geological;
- hydrographical
- structural
- land use
- population distribution
- aerial
- local plans (selected settlements)

National co-ordinate system:

- transverse Mercator projection
- polar
- rectangular
- geographical

Presentation of measurements:

- maps, plans, diagrams
- reports
- interpretation of existing information

Development purpose include:

- residential
- commercial
- industrial
- leisure
- transportation
- water supply (river regulation, impounding reservoir)

Natural features

- forestation
- water-courses

Purpose of topographical survey

- plan preparation
- verification of existing features

Uses of contour maps:

- interpretation of the relief of a land area
- sections
- inter-visibility
- earthworks (e.g. cut and fill lines)
- gradients

Contour methods:

- direct (vertical control, horizontal control)
- indirect (straight lines; spot heights)

Methods for recording dimensions and features of a building:

- dimensions (running, string)
- symbols
- notes
- photographs
- samples

Purpose of a measured survey:

- alterations
- maintenance
- valuations
- land transfer
- conditions

Measured survey:

- dimensional
- fabric condition
- features (windows, doors, services)

Drawings:

- elevation
- site plan

Equipment for measured survey:

- hand spirit level
- plumbing pole
- tape
- camera
- ordnance survey sheet
- squared paper
- level
- personal protective equipment

Fabric condition report:

- materials
- fittings
- suitability for purpose
- maintenance requirements
- costing of repairs

Current drawing standards:

- appropriate drawing convention standards

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

Critical Aspects of Evidence (cont'd)

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- examination of maps and interpretation of information for development purposes
- presentations of measurements made in land surveying
- selection and use of equipment
- process of carrying out a measured survey
- production of accurate drawings based on data from the survey

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- national co-ordinate system:
- types of maps for surveying
- development purpose of measured survey
- methods for recording dimensions and features of a building
- measured survey and purpose
- drawing standards
- equipment for measured survey

Skill

The ability to:

- examine survey maps and interpret relevant information
- carry out a measured survey

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> • Carries out established processes • Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> • Manages process • Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> • Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGBCD0243A: Demonstrate knowledge of construction science for the internal environment

Competency Descriptor:

This unit deals with the skills and knowledge required to apply knowledge of construction science for the internal environment to construction applications

Competency Field: Construction Draughting

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Investigate the acoustic performance of the building envelope	1.1	The nature of sound is described.
		1.2	Principles of sound transmission are described.
		1.3	Methods of measuring sound levels are identified.
		1.4	Sound levels are calculated from measured intensities and pressures.
		1.5	Factors affecting behaviour of sound within an enclosure is described.
		1.6	Methods of improving acoustic performance of a hall are described.
2.	Investigate the illumination within a low-rise domestic building envelope	2.1	The nature of light is identified and units of measurements defined.
		2.2	Types of luminare are identified and their mode of operation is compared.
		2.3	The advantages and disadvantages of different luminaries are evaluated.
		2.4	Lighting levels from point sources are calculated for a room in a low-rise domestic building, using inverse square and cosine laws.
		2.5	Lighting levels from an array of luminaries are calculated for a room in a low-rise domestic building using the lumen design method.
		2.6	Daylight factor components are established for a given room using appropriate techniques.

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Nature of sound includes:

- frequency
- wavelength
- intensity
- pressure
- loudness
- velocity in given media

Sound transmission includes:

- airborne
- Impact
- flaking

Principles of sound transmission:

- mass law
- effect of frequency
- sound reduction indices

Methods of measuring sound:

- sound meter
- I10 traffic noise meters

Factors affecting behaviour of sound within an enclosure:

- reverberation
- reverberation time
- coefficients of sound absorption
- effects (occupants, construction materials, room shape)
- frequency

Methods of improving acoustic performance:

- Improved layout
- additional sound absorption
- construction materials (glazing, partition walling)

Acoustic performance:

- reverberation time
- transmission
- absorption

Nature of light:

- frequency
- wavelengths
- emission spectra

Units of measurements:

- candela
- lumen
- lux
- steradian

Types of luminary includes:

- incandescent (tungsten, filament light bulb, halogen lamp)
- discharge (fluorescent)

Daylight factor components:

- sky component
- ERC
- IRC

Advantages/disadvantages of different luminaries:

- headings
- cost (capital, operation)
- luminous efficacy
- weight
- ease of installation
- heat generated
- switches
- maintenance
- replacement
- colour rendering

Appropriate techniques to established daylight factor components:

- daylight protractors
- daylight tables
- BRE monograms
- daylight factor meter

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organisational management policies and procedures including quality assurance requirements where applicable
- proper description of the nature of sound
- calculation of sound levels from measured intensities and pressures
- identification of the nature of light and definition of units of measurements
- identification of types of luminary and comparison of their mode of operation
- calculation of lighting levels in a room in a low-rise from point sources using inverse square and cosine laws
- calculation of lighting levels in a room in a low-rise from point sources using the lumen design method

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- nature of sound
- how sound is transmitted
- principles of sound transmission
- methods of measuring sound
- factors affecting behaviour of sound within an enclosure
- improving acoustic performance
- nature of light
- units of light measurement
- luminary types
- advantages/disadvantages of luminary types
- techniques to established daylight factor components

Skill

The ability to:

- read and interpret technical specification
- measuring sound levels
- calculate sound levels
- identify luminary types and compare their mode of operation
- calculate lighting levels from various luminaries

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- Access to building and construction data

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process.

Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the Critical Employability Skills.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
Perform: <ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	Administer and manage: <ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	Design and evaluate: <ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

BCMBSV0014A: Apply building codes and standards to building

Competency Descriptor:

This unit deals with the competency required to ensure the building process complies with the Building Code of Jamaica and relevant Jamaican Standards. It includes the evaluation and interpretation of building requirements, classification of buildings according to the Building Code of Jamaica criteria and strategies for compliance.

Competency Field: Construction Site Management

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Analyse the purpose and basic intent of the Jamaica's Building Code	1.1	Objectives of the Building Code of Jamaica and the purpose of the respective components are evaluated and documented.
		1.2	Deemed-to-Satisfy (DTS) concept for construction to meet Building Code requirements are evaluated and documented.
2.	Locate and interpret code/ standard requirements that are applicable to particular projects	2.1	Clauses from the Building Code that apply to particular projects are identified and documented.
		2.2	Prescriptive requirements of relevant Building Code clauses are determined.
		2.3	Requirements of Jamaican Standards referenced in the Building Code are identified and documented.
		2.4	Special requirements that may be applicable to specific areas are identified and documented.
3.	Classify buildings	3.1	Nature of a building having regard to use and arrangement is determined.
		3.2	Building Code criteria are applied to determine the defined classification.
		3.3	Building Code requirements are interpreted for multiple classifications.

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| 4. | Apply solutions to construction problems for compliance with the Building Code | 4.1 | Criteria to ensure construction methods comply with the intent of the Building Codes are determined. |
| | | 4.2 | Alternative approaches to construction problems that comply with the requirements of the Building Code are reported. |
| | | 4.3 | Assessment methods used to determine whether a building solution complies with performance requirements or Deemed-to-Satisfy provision of the Building Code are analysed and applied. |
| | | 4.4 | Assessment methods are confirmed and identified as appropriate to meet the DTS provisions of Building Code. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

Competency requires the demonstration of research, analysis, evaluation and reporting skills in the determination of compliance within the context of relevant legislation, the Building Code of Jamaica and other relevant National Standards.

The following variables may be present for this particular unit:

Construction in residential buildings is to include but not be limited to:

- compliance with relevant legislation
- design specifications
- maintenance specifications
- relevant National Standards and evaluation
- interpretation and adherence to relevant legislative requirements for Building Codes of Jamaica

Building categories may include but not be limited to:

- single storey and
- low-rise residential buildings

Residential building projects requiring review of compliance issues are to include but not be limited to:

- provision of site access/facilities
- work schedules
- project milestones and
- the calculation and processing of application or inspection fees

Standard specifications may include but not be limited to industry standard specifications and may be:

- preliminary/outline specifications
- developed specifications or detailed specifications (addressing specific components such as structural or other requirements)

Building surveying procedures are to include but not be limited to:

- mechanical
- structural
- electrical and
- may include other services

Reporting systems in accordance with organizational, legislative and quality assurance procedures are to include:

- desk based assessment and
- may include site-based assessment

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Performance Criteria and Range Statement.

(1) Critical Aspects and Evidence

What critical aspects of evidence are required to demonstrate competency in this unit?

- compliance with occupational health and safety regulations applicable to workplace operations
- application of organizational management policies and procedures including quality assurance requirements where appropriate
- classification of construction in residential buildings through the evaluation and interpretation of compliance with the building code of Jamaica, the associated reporting of data, findings, recommendations and strategies for at least one (1) residential building project or equivalent in compliance with relevant legislation
- provision of reports to appropriate body/individual as determined by the project brief
- application of strategic plans, workplace policies and procedures

(2) Pre-requisite Relationship of Units

There are no specified relationships.

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- processes for the interpretation of reports, working drawings and specifications
- nature of materials and effect on performance
- authorities and powers of a building surveyor
- relevant State legislation and local government policy and procedures
- design, construction and structural principles of buildings
- building Code of Jamaica
- deemed To Satisfy (DTS) provisions

Underpinning Knowledge and Skills (cont'd)

Skills

The ability to:

- research, analyse, organise and understand the process for assessing compliance on residential buildings plus subsequent reporting procedures
- communicate and negotiate ideas and information to enable confirmation of work requirements and legislation translation of compliance issues in residential buildings
- plan and organise activities including the planning of analytical processes, the assessment of strategies related to the determination and resolution of compliance issues in residential buildings
- work with others and in a team by recognising dependencies and using co-operative approaches to optimise satisfaction and productivity
- establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimise reworking and avoid wastage
- use mathematical ideas and techniques to correctly complete measurements, calculate analytical requirements, establish realistic sample criteria, quantify, survey and present analytical results
- use workplace technology related to information gathering and analysis, diagnosis, information research, report writing, administration and management procedures

(4) Resource Implications

A situation, real or realistically simulated, requiring application of building codes and standards to residential buildings.

The learner and trainer should have access to appropriate documentation and resources normally used in the workplace.

(5) Method of Assessment

Assessment of this competency is most likely to be project related under real or simulated conditions and require portfolios or other forms of indirect evidence of process. Direct evidence may include certification of compliance on the final outcome or authorisation for commencement by a competent authority.

Assessment must confirm the inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment should reinforce the integration of the key competencies.

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide and within the scope defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Construction Training Package.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1	Level 2	Level 3
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 3	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCMFLS0033A: Lead the work of teams and individuals

Competency Descriptor:

This unit deals with the skills and knowledge required to lead a team or work group in a building and construction environment. It includes developing plans, providing leadership and supervising the performance of a group.

Competency Field: Business – Front-Line Management

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan the work of teams and individuals	1.1 Opportunities are given to team members to contribute to the planning and organisation of their work.
	1.2 Plans are consistent with team and organisational goals and objectives and appropriate statutory requirements.
	1.3 Plans cover all those personnel for whose work the individual is responsible.
	1.4 Plans and schedules are realistic and achievable within organisational constraints.
	1.5 Plans and work allocation take full account of team members' abilities and development needs.
	1.6 Work plan and activities are explained to team members in detail and at a level and pace appropriate to them.
	1.7 The team members' understanding of plans and their work activities confirmed.
	1.8 Plans are updated at regular intervals and take account of relevant changes.
2. Develop team commitment and co-operation	2.1 Assistance given to the team to use open communication processes to obtain and share information.
	2.2 The team makes decisions in accordance with its agreed roles and responsibilities.
	2.3 Support given to the team to develop mutual concern and camaraderie.
3. Co-ordinate and develop team performance	3.1 The results achieved by the team contribute positively to the organisation's plans and objectives.
	3.2 The team is encouraged to exploit innovation and initiative.

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| | 3.3 | Team and individual competencies are monitored regularly to confirm that the team is able to achieve its goals. |
| | 3.4 | Team members share and enhance their knowledge and skills. |
| 4. Assess the work of teams and individuals | 4.1 | The purpose of assessment is clearly explained to all involved. |
| | 4.2 | Opportunities are given to team members to assess their own work. |
| | 4.3 | Assessments are based on sufficient, valid and reliable information. |
| | 4.4 | Assessments are objectively carried out on agreed criteria. |
| 5. Provide feedback to teams and individuals on their work | 5.1 | Feedback is provided to team members in a manner most likely to maintain and improve performance. |
| | 5.2 | The feedback given is clear and is based on an objective assessment of team members' work. |
| | 5.3 | Feedback recognises team members' achievements and provides constructive suggestions and encouragement for improving their work. |
| | 5.4 | Feedback is given in a manner, which promotes goodwill with individuals involved. |
| | 5.5 | All feedback to individuals and teams is treated confidentially. |
| | 5.6 | Opportunities are given to team members to respond to feedback and to recommend how they could improve their work. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competence, allowing for differences between schools and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Frontline supervisor at this level operates in a relatively simple and routine workplace environment in which they use the organisation's:

- goals, objectives, plans, systems, processes
- quality and continuous improvement processes and standards
- access and equity principles and practice
- defined resource parameters

The supervisor may:

- adopt a variety of roles in teams including leader, facilitator, participant, coach, mentor

Teams may include full time employees, contractors, part time employees and includes:

- operator
- craft personnel
- labourers

Knowledge and skill development may take place through a variety of methods including:

- coaching
- mentoring
- exchange/rotation
- shadowing
- action learning
- structured training programmes

Competencies refer to the abilities of the team members and may be:

- formally recognised or not formally recognised
- industry-wide, enterprise specific or individual specific

Statutory requirements, which may affect work planning include:

- relevant legislation for the building and construction industry, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
- relevant industry codes of practice

Teams may be:

- one or a mixture of on-going, work-based, project-based, task specific, or cross-functional

The organisation's goals, plans and objectives refers to those relevant to:

- the frontline supervisor's work activities and
- the teams in which frontline supervision is involved

Assessment for:

- appointment
- promotion
- yearly, half-yearly, quarterly

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, underpinning knowledge and skills to be demonstrated to confirm competence for this unit. This is an integral part of the assessment of competence and should be read in conjunction with the Range Statement.

(1) Critical Aspects of Evidence

- provides leadership to team
- contributes positively to team performance
- provides coaching and mentoring support
- provides assessment and feedback

(2) Pre-requisite Relationship of Units

Pre-requisite for this unit is:

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- the importance of effective communication when explaining work plans and allocations
- how to present work plans in a way that gains the support and commitment of those involved
- the importance of regularly reviewing work
- the importance of providing team members with the opportunity to contribute to the planning and organisation of their work
- the types of organisational constraints, which influence planning
- the importance of planning work activities to ensure organisational effectiveness and supervisor's role and responsibilities in relation to this
- how to develop realistic and achievable work plans for teams and individuals both in the short and medium term
- the team's objectives and how plans will succeed in meeting these objectives
- the importance of being clear about the purpose of an assessment and of communicating this effectively to those involved
- the importance of assessing the ongoing work of teams and individuals and the supervisor's role and responsibilities in relation to this
- how to gather and evaluate the information needed to assess the work of teams and individuals
- the importance of providing opportunities to team members to assess their own work and
- how to encourage and enable this involvement
- the range of purposes of work assessment
- why work assessment may play a role in an organisation and how they apply to your own situation
- how to assess the work of teams and individuals, and processes in the workplace, which can support such assessment
- how to provide both positive and negative feedback to team members on their performance
- how to choose an appropriate time and a place to give feedback to teams and individuals
- how to provide feedback in a way, which encourages team members to feel that they are respected
- the importance of providing clear and accurate feedback to team members on their performance and the supervisor responsibilities in relation to this
- the principles of confidentiality when providing feedback
- how to motivate team members and gain their commitment by providing feedback

Underpinning Knowledge and Skills

Skills

The ability to:

- access and use workplace information
- assess the competence of the team
- facilitate the participation of team members
- work effectively with team members who have diverse work styles, aspirations, cultures and perspectives
- facilitate team development and improvement
- assess competency development requirements
- gain the trust and confidence of colleagues
- deal with people openly and fairly
- use coaching and mentoring skills to provide support to colleagues
- relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities

(4) Resource Implications

- the learner and trainer should have access to appropriate documentation and resources normally used in the workplace

(5) Method of Assessment

In order to achieve consistency of performance, evidence should be collected over a set period of time, which is sufficient to include dealings with an appropriate range and variety of situations

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide, and within the scope as defined by the Range Statement

Assessment must take account of the endorsed assessment guidelines in the Business Services Competency Standards Package.

Assessment of performance requirements in this unit should be undertaken in an actual workplace or simulated environment.

Assessment should reinforce the integration of the Critical Employable Skill Competencies and the Business Services Common Competencies for the particular Level. Refer to the Critical Employable Skills Levels at the end of this unit.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCMCSS0033A: Co-ordinate site storage and timekeeping operations

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively and safely co-ordinate the handling and storage of construction materials on construction sites and to monitor and record timesheet information.

Competency Field: General Construction – Site Storage

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1 Monitor and control the receipt of stocks	<ul style="list-style-type: none"> 1.1 Occupational Health and Safety (OH&S) requirements associated with materials handling and storage at construction site recognised and adhered to. 1.2 Quality Assurance requirements associated with company's construction operations recognised and adhered to. 1.3 The receiving area is prepared to take deliveries in accordance with organisation's procedures. 1.4 Equipment and manpower for handling materials consistent with job requirements. 1.5 Delivery documentations are checked against purchase specifications and deviations are identified. 1.6 Materials received are matched against documented information and any discrepancies are correctly identified. 1.7 Prompt and appropriate action is taken to rectify discrepancies and deviations identified. 1.8 Where appropriate, materials are moved to storage area. 1.9 Security procedures are followed throughout.
2. Co-ordinate stocks storage and protection	<ul style="list-style-type: none"> 2.1 Storage areas are fully prepared and maintained according to organisational requirements. 2.2 Materials stored, stacked/stockpiled and protected, clear of traffic ways, so they are easily identified and retrieved. 2.3 Materials are handled, lifted and carried in accordance with product requirements and organisational work procedure. 2.4 Access to stock and the use of space are optimised. Stock rotation procedures are fully followed.

- 2.5 Defects or losses of stock in storage are identified and the appropriate action taken.
- 2.6 Security of stock is maintained according to organisation's procedures.
- 2.7 Documentation is prepared accurate, complete, legibly and in the prescribed format.
- 3. Control the issue of stocks
 - 3.1 Checks are carried out to ensure that records of stock issues are complete, accurate and are available to the relevant personnel.
 - 3.2 Types and quantity of materials issued are checked to confirm that they conform to specified job requirements.
 - 3.3 Stock rotation procedures and policy are followed where appropriate, when issuing materials.
 - 3.4 Power tools and equipment are issued based on work requirements.
 - 3.5 Materials/equipment issued are checked and signed for by the receiver.
 - 3.6 Records of stock issues are complete, accurate and are available to the relevant personnel.
- 4. Co-ordinate and participate in stock taking
 - 4.1 Stock taking procedures are effectively communicated to appropriate personnel.
 - 4.2 Inventory control system is accurately identified and checked.
 - 4.3 Information sources used to provide data on stock holding accurately interpreted.
 - 4.4 Appropriate action taken to ensure stock types are correctly identified and accurately counted in designated units.
 - 4.5 Stocks levels are recorded accurately using approved documentation/equipment.
 - 4.6 Damaged or obsolete stocks are identified, noted and reported to the relevant person.
 - 4.7 Records of physical stock taking are complete, accurate and up to date.

- 4.8 Additional information, which affects stock reconciliation, is obtained.
- 5. Check and document work information
 - 5.1 Evidence of knowledge of the types of work, and units of work in construction is demonstrated.
 - 5.2 The ability to correctly interpret timesheets, etc, to compile worker's time, and to measure and estimate quantity of piecework is demonstrated.
 - 5.3 Information relevant to the correct work programme is collected and checked to ensure its suitability and correctness.
 - 5.4 Documentation relevant to workers is reviewed and total hours worked are accurately computed.
 - 5.5 Work units or quantity of contracted work completed are accurately identified, measured and/or calculated.
 - 5.6 Where appropriate, workers are located at various times on the project to verify information collected.
 - 5.7 Completed documentation is accurate, complete, legible, in the approved format and submitted promptly to the relevant person.

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

OH&S requirements to be in accordance with (Statutory/Territory) legislation and regulations

Receiving area:

- store building
- yard storage

Delivery documentation:

- delivery slips
- purchase invoices

Storage facilities:

- shelves
- bins
- cabinets
- racks
- yard spaces

Appropriate action:

- investigate
- replace and report

Stock rotation procedures:

- first in – first out

Tools and equipment includes but are not limited to:

- brooms
- hoses
- shovels
- rakes
- wet and dry industrial vacuum cleaners
- wheelbarrows
- pallet trolley
- materials hoists
- forklifts
- pickaxes
- tamping machine
- pavement saw
- hand roller
- compressor

Construction materials include but are not limited to:

- concrete blocks
- mortar components – cement, coarse aggregate, sand
- timber
- structural steel sections/components
- concrete
- scaffolding components, pipe sections
- plywood and particle board
- metal sheeting
- steel reinforcement
- fasteners
- insulation
- glass
- paints and sealants
- plaster sheeting
- plastic

Inventory control systems:

- Inventory cards
- computerised system

Work documentations include:

- timesheets
- work-charts
- timecards
- bills of payment

Timesheet information:

- hours worked- normal, overtime
- work completed

EVIDENCE GUIDE

Competency is to be demonstrated by the effective co-ordination of construction site storekeeping functions and the preparation/documentation of work information.

(1) Critical Aspects and Evidence

- Demonstrate compliance with Occupational Health and Safety regulations and legislation applicable to workplace operations.
- Indicate compliance with organisational policies and procedures including Quality Assurance requirements.
- Demonstrated ability to plan, organise and adopt safe and healthy working practices.
- Co-ordinate the receipt of materials, tools and equipment at construction site storage.
- Demonstrated ability to co-ordinate and monitor storage, protection and issuing of stocks.
- Preparation/checking and documenting of work completion information.
- Relate to people from varied social, cultural and ethnic background.
- Evidence is best gathered through a holistic assessment activity, which integrates the elements of Competency.

(2) Pre-requisite Relationship of Units

Pre-requisite for this unit is

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

knowledge of:

- organisational policy on storage and supplies
- principles in relation to quality control
- security arrangements and procedures
- the organisation's documentation procedures
- types of materials used in construction
- handling and storing construction materials
- stock rotation principles and methods
- stock control methods and procedures
- handling hazardous and non-hazardous materials
- systems and procedures for recording stocks
- information of stock control procedures
- how to reconcile discrepancies
- use of electronic documentation
- procedures for measuring and quantifying work completion and collecting information
- chemical characteristics of material to be handled

Skills

The ability to:

- co-ordinate and monitor safety and quality assurance issues
- arrange for stock receipt for storage
- monitor control of stock issuing
- measure and quantify work completion
- communicate effectively

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment. If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- a real or simulated environment
- project resources
- organisation policies and guidelines
- access to relevant resource personnel
- relevant legal and statutory documentation

(5) Method of Assessment

Assessment against this unit may involve the following:

Continuous assessment in a setting that stimulates the conditions of performance described in the elements, performance criteria and range statements that make up this unit.

Continuous assessment in the workplace, taking into account the range on variables affecting performance.

Self-assessment on the same terms as those described above.

Simulated assessment or critical incident assessment, provided that the critical incident involves assessment against performance criteria and an evaluation of underpinning knowledge and skill required to achieve the required performance outcomes.

(6) Context of Assessment

For valid and reliable assessment of this unit, the competency should be demonstrated over a period of time and observed by the assessor.

The competency is to be demonstrated in a range of situations, which may include involvement in related activities normally experienced in the workplace.

Evidence of underpinning knowledge understanding of processes and principles can be gained

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCGMAS1613A: Carry out concrete slump test**Competency Descriptor:**

This unit deals with the skills and knowledge required to conduct a slump test to concrete to ensure the mix is workable and complies with the delivery documentation and specified order. The unit includes sampling and slump testing to a set range or tolerance.

Competency Field: Construction Frontline Supervision

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare	1.1 Job instructions, including plans, specifications, quality requirements and operational details are obtained, confirmed and applied. 1.2 Safety requirements are implemented in accordance with safety plans and policies. 1.3 Signage/barricade requirements are implemented as required. 1.4 Tools and equipment selected are consistent with the requirements of concrete slump testing. 1.5 Environmental protection requirements are applied in accordance with environmental plans and regulatory obligations.
2. Slump test concrete	2.1 Standard slumping cone is cleaned in preparation for testing. 2.2 Sample of concrete, using the correct sampling procedure, is taken directly from the delivery trucks initial discharge. 2.3 Slumping cone is placed on a steel tray and cone filled to one third of its capacity. 2.4 Concrete is compacted by rodding 25 times in an even pattern with a steel rod. 2.5 Slumping cone is filled to two thirds its capacity and rodding 25 times applied to penetrate the previous layer. 2.6 Slumping cone is filled to overflowing and rodding 25 times applied to penetrate the previous layer. 2.7 Slumping cone is levelled off with the steel rod and surplus concrete cleared from steel plate and slumping cone.

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| | 2.8 | Slumping cone is raised without moving the sample. |
| | 2.9 | Sample is measured against height of the slumping cone for conformity. |
| | 2.10 | Collapsed or sheared samples are recorded. |
| 3. | Co-ordinate clean up | |
| | 3.1 | Work area is cleared and materials disposed of, reused or recycled in accordance with codes of practice and job specification. |
| | 3.2 | Tools and equipment are removed from work area, cleaned and stored in accordance with manufacturers' recommendations and standard work practices. |
| | 3.3 | Work completion procedures are followed and relevant personnel notified that the test is finished. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables relate to this particular unit:

Planning and preparation is to include but not be limited to:

- worksite inspection
- equipment defect identification
- assessment of conditions and hazards
- determination of work requirements

OH&S requirements may include:

- protective clothing and equipment
- use of tools and equipment
- workplace environment and safety
- handling of materials
- organisational first aid
- hazard control and hazardous materials and substances

Roding is to include:

- pushing a steel rod in and out of the concrete to compact it into the slump cone, 25 times for each layer applied

OH&S requirements are to be in accordance with:

- legislation/regulations/codes of practice
- organisational safety policies and procedure
- project safety plan

Personal protective equipment is to include:

- goggles
- safety boots
- cover all
- gloves

Measuring is to include:

- a steel rule, which is placed in the centre of the sample to which the conformity of the slump is tested

Standard slumping cone:

- Is 200mm in diameter at the base, 100mm in diameter at the top and 300mm tall
- include foot pieces for standing on while the sample is added and Roding occurs in the cone
- has handles for raising the cone when Roding is completed

Safe operating procedures include but not limited to the conduct of operational risk assessment, including:

- overhead electrical service apparatus
- working with dangerous materials
- working in confined spaces
- surrounding structures
- restricted access barriers
- traffic control
- working at heights
- working in proximity to others
- worksite visitors and the public

A slump test is successful when:

- the sample remains true and does not collapse or shear
- Note: If the initial test fails a second test must be undertaken, if it also fails the batch should be rejected

Information sources may include but not be limited to:

- verbal or written and graphical instructions, signage, work schedules/plans/specifications, material safety data sheets (MSDS), diagrams or sketches
- safe work procedures related to slump testing concrete
- regulatory/legislative requirements pertaining to slump testing concrete
- engineers design specifications/manufacturers' specifications and instructions where specified
- organisation work specifications and requirements
- instructions issued by authorised organisational or external personnel
- relevant Building Standards

Sampling is to include but not be limited to:

- that taken at initial discharge (after 0.2m³ of the load has been placed)
- routine samples taken at three places during the load

Tools and equipment are to include:

- standard slump cones
- sampling scoops
- bullet nosed rod (600mm long x 16mm diameter)
- steel rule
- steel slump plate (500mm x 500mm)

Environmental requirements are to include but are not limited to:

- waste management
- noise, dust, vibration
- clean-up management

Communications may include:

- mobile phone
- site specific instructions
- written instructions
- plans or instructions related to job/task
- two way radio
- hand signals

Quality requirements are to include but not be limited to relevant regulations including:

- National Standards
- internal company quality policy and standards
- workplace operations and procedures
- manufacturers specifications where specified

Communications are to include but not limited to:

- verbal and visual instructions
- fault reporting

Tools and equipment may also to include:

- trowels
- steel trowels
- wooden floats
- buckets
- sponges and brushes

Materials:

- materials are to include concrete

On site meeting processes may include notification/ scheduling (time, place, and purpose), task discussions and local co-ordination of procedural and operational issues.

EVIDENCE GUIDE

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the Performance Criteria, the Range Statement, and the Assessment Guidelines of the Training Package.

Rodding is to include:

- pushing a steel rod in and out of the concrete to compact it into the slump cone, 25 times for each layer applied

Measuring is to include:

- a steel rule, which is placed in the centre of the sample to which the conformity of the slump is tested

(1) Critical Aspects of Evidence

Location, interpretation and application of relevant information, standards and specifications

- compliance with site safety plan and OH&S legislation/regulations/codes of practice applicable to workplace operations
- compliance with organizational policies and procedures including quality requirements
- safe and effective operational use of tools and equipment
- communication and working effectively and safely with others
- completion of three slump tests from different batches in accordance with specifications

(2) Pre-requisite Relationship of Units

BCGCM1001B Follow OH&S policies and procedures

Competency in this unit may be assessed in conjunction with other functional units, which together form part of the holistic work role.

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- workplace and equipment safety requirements
- quality requirements
- general Construction terminology
- properties of concrete (strength, water content ratio, transportation, placement, compaction and curing)
- slump testing techniques
- slump testing tools and equipment types, characteristics, uses and limitations
- material Safety Data Sheets
- plans, drawings and specifications
- materials handling, storage and environmentally friendly waste management
- relevant acts, regulations and codes of practice
- jsa's/Safe work method statements

Skills

The ability to:

- collect, organise, interpret and understand the information required for slump testing concrete
- communicate ideas and information orally and in writing
- conduct activities associated with slump testing concrete
- work with others and in a team by recognising dependencies and using co-operative approaches to optimise satisfaction and productivity
- establish safe and effective work processes
- use mathematical ideas and techniques to correctly calculate time to complete tasks, estimate measurements, levels, calculate material requirements and establish quality checks
- use workplace technology related to slump testing concrete, including the use of calculators, the use of communication devices and the reporting/recording of results

(4) Resource Implications

The following resources should be made available:

- workplace location or simulated workplace
- equipment and tools appropriate to slump testing concrete
- realistic activities covering the mandatory task requirements
- specifications and work instructions

(5) Method of Assessment

Assessment must satisfy the endorsed assessment guidelines of the Building and Construction industry's General Construction Training Package.

Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge.

Assessment must be by direct observation of tasks, with questioning on underpinning knowledge and it must also reinforce the integration of key competencies.

Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge.

Assessment may be applied under project related conditions (real or simulated) and require evidence of process.

Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

Assessment may be in conjunction with assessment of other units of competency, including those listed above.

(6) Context of Assessment

The application of competency is to be assessed in the workplace or realistically simulated construction site.

Assessment is to occur using standard and authorized work practices, safety requirements and environmental constraints.

Assessment of essential underpinning knowledge, other than confirmatory questions, will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory requirements including specified Australian Standards.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.



BCGCSS0053A: Co-ordinate erection of formwork and temporary support structures

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively co-ordinate the erection, stripping and storage of formwork and temporary support structures components. It applies to individuals working in the supervision of teams working in the casting of concrete to form concrete structures.

Competency Field: General Construction

ELEMENT OF COMPETENCY PERFORMANCE CRITERIA

1. Plan and prepare work	1.1	Job instructions/specifications accurately read and interpreted.
	1.2	Quality Assurance requirements of company's construction operations recognised and adhered to.
	1.3	Preparation and planning requirements identified from drawings and/or site manager's instructions.
	1.4	Occupational Health and Safety (OH&S) requirements identified and adhered to in accordance with application tasks and workplace environment.
	1.5	Safety hazards identified and correct procedures implemented to prevent or minimise risk to self and others.
	1.6	Materials selected to work instructions, and appropriate action taken to ensure that they are safely handled, stored/located and ready for application.
	1.7	Appropriate personal protective equipment selected and made ready for work teams.
	1.8	Tools and equipment selected are consistent with job requirements, and are available at work site. Reported faulty tools and equipment are responded to promptly.
2. Co-ordinate set out of formwork	2.1	Set out points checked and confirmed that lines are located according to engineer's drawings, survey datum points and site plan.
	2.2	Positioning of formwork components confirmed as located to predetermined set out.



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| 3. | Co-ordinate assemble of core form systems | 3.1 | Internal pre-fabricated system wall form shutters erected and fixed into locations to engineering drawings and specifications. |
| | | 3.2 | Concrete nib walls poured to heights consistent with engineer's requirements. |
| | | 3.3 | Erected shutters fitted to nib walls. |
| | | 3.4 | Shear key feet installed to manufacturer's specifications. |
| | | 3.5 | Platforms and assembly fitted into core to manufacturer's specifications. |
| | | 3.6 | Structural steel systems grid-work and hydraulic hose lines fitted to manufacturer's specifications. |
| | | 3.7 | Wall form shutters suspended and system cladding and platforms fitted and completed to manufacturer's specifications and engineer's requirements. |
| | | 3.8 | Temporary lighting and emergency electrical work carried out according to specifications and authority requirements. |
| | | 3.9 | Structure aligned, plumbed/levelled and secured according to specification. |
| 4. | Locate and install penetrations | 4.1 | Locations and dimensions of penetrations set out in line with designated tolerance from engineering drawings. |
| | | 4.2 | Penetration block outs constructed where required to engineering drawings and specifications. |
| | | 4.3 | Penetrations installed to requirements of engineering drawings and specifications. |
| | | 4.4 | Penetration block outs installed as slop form reaches locations, to engineer's specifications. |
| 5. | Install reinforcement | 5.1 | Reinforcement bars and/or mesh installed and fixed to conform to engineer's specifications. |
| | | 5.2 | Where required, jacking rods installed and fixed to designed locations to engineer's specifications. |
| 6. | Close shutters | 6.1 | External prefabricated system wall shutters erected and fixed into location to engineer's and manufacturer's specification. |



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| 7. | Locate yokes, jacks and connect hydraulic system for slip form formwork | 7.1 | Systemised yokes installed to jacking rods within reinforcement and wall form shutters in accordance with engineer's specifications. |
| | | 7.2 | Jacks installed on yokes to requirements in accordance with system design and engineer's specifications. |
| | | 7.3 | Hydraulic hose lines fitted to jacks and central control system to engineer's specifications. |
| 8. | Place concrete | 8.1 | Concrete placed and consolidated within system wall form shutters to engineer's requirements. |
| | | 8.2 | Rate of placement of concrete maintained to rate of slip of formwork to engineer's specifications and instructions. |
| | | 8.3 | Concrete cured to engineer's specification. |
| 9. | Activate jacking system | 9.1 | Hydraulic jacking system activated in accordance with engineer's specifications and design to slip formwork. |
| | | 9.2 | Formwork systems jacked into progressive position according to engineer and manufacturer's specifications. |
| | | 9.3 | Trailing platforms installed to engineer's specifications. |
| | | 9.4 | Stairs and access ways installed according to drawings and engineer's specifications. |
| | | 9.5 | Formwork progressively slipped to completion of pour. |
| | | 9.6 | Reinforcement and jacking rods extended during progress of slip operation, to engineer's specifications/directions. |
| 10. | Co-ordinate dismantle system | 10.1 | System dismantled in accordance with manufacturers and engineer's specifications. |
| | | 10.2 | Working area monitored to ensure safety maintained according to OH&S regulations. |
| 11. | Co-ordinate clean up | 11.1 | Instructions given/appropriate follow-up actions taken place to ensure: <ul style="list-style-type: none">• Unused material stacked/stored for re-use.• Work area cleared.• Tools and equipment cleaned, maintained and stored. |
| | | 11.2 | Waste disposal conforms to organisational and the National Environmental Protection Agency (NEPA) requirements. |



RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to erection or modification of systemised formwork constructed and operated to engineer's specifications for slip or jump formwork.

The following variables relate to this particular unit:

Formwork systems

- jump type formwork
- slip type formwork

Formwork systems may include:

- timber
- steel
- composite construction

Formwork type to include:

- footings
- walls
- decking
- beams
- lintels
- columns
- piers
- stairs,
- chambers
- tanks
- ramps

Temporary supporting structures include:

- open and close sheeting
- hydraulic support systems

Components for temporary support structures:

- wood: poling boards, waling, ground props, wedges plates
- metal: waling, waling frames, leading sheets, intermediate sheets

Personal protective equipment may include:

- overalls
- jacket
- hard hat
- safety goggles
- safety boots
- gloves
- ear muffs

Tools and equipment may include but are not limited to:

- measuring tape/rule
- hammer
- spirit level
- nail bag
- levelling equipment
- chisels
- hand saws
- saw stools
- power saws
- power drills
- air compressor and hoses
- power leads/extension cords

Fixing and fastening may include:

- nails
- screws
- self tapping screws



- bolts and nuts
- patented clips
- brackets
- welding

- spanners
- pneumatic wrenches
- ladder/scaffolding
- pincer
- nipper

Quality Assurance requirements may include:

- workplace operations and procedures
- quality of materials
- control of handling procedures
- use and maintenance of equipment
- attention to work specifications

OH&S requirements to be in accordance with Statutory Legislation and Regulations and may include:

- workplace environment and safety
- protective clothing and equipment
- use of tools and equipment
- handling of materials
- working platforms and scaffolding
- working with hydraulic equipment

EVIDENCE GUIDE

Competency is to be demonstrated by working with a team to carry out the safe and effective way in erecting/dismantling of slip or jump form formwork to engineer's design and industry standards on a designed project

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- Demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations.
- Show compliance with organisational policies and procedures.
- Apply organisational quality procedures and processes within the context of erecting and operating jump formwork to form concrete.
- Give attention to accurate setting out for location of formwork.
- Adopt and use safe and effective procedures in the assembling of shutters.
- Give attention to specification details in erecting formwork and structural steel support.
- Give attention to assembling and installing all platforms, walkways and stairs supporting formwork operation.
- Apply correct procedures in setting up block-outs and placing reinforcement to specifications.
- Give appropriate attention in team operation to the processes of pouring concrete and jumping formwork to next location.
- Identify faults and problems that occur and necessary action taken to rectify.
- Interactively communicate with work teams to ensure safe and effective worksite operations.
- Demonstrate ability to give technical support and directives to teams and individuals.

**(2) Pre-requisite Relationship of Units**

Pre-requisites for this unit are:

- BCGFLS0023A Maintain health, safety and security in the workplace
- BCGCOR1583A Read and interpret plans

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- workplace and equipment safety requirements including relevant statutory regulations, codes and standards
- systemised formwork construction
- slip formwork design
- understanding of hydraulic pressure on formwork by concrete when placed
- safe handling and storage of chemicals and flammable liquids
- Standards – Formwork for Concrete
- materials and components
- company's quality system and role of individuals within that system
- understanding of hydraulic jacking systems
- plant, tools and equipment
- reinforcement in concrete
- worksite communication

Skills

The ability to:

- work safely
- interpret drawings, specifications and documentation
- organise work
- use tools plant and equipment
- select and identify materials relevant to task
- handle materials
- fit and secure materials
- measure accurately
- communicate effectively
- plumb and level form work

(4) Resource Implications

The following resources should be provided:

- worksite location developed to base slab
- materials and components appropriate to proposed activity
- tools, plant and equipment appropriate to construction and installation processes
- appropriate communication of documentation relevant to activity and tasks

(5) Method of Assessment

Competency in this unit may be determined concurrently based upon integrated project work.

Competency should be assessed through direct observation of application to tasks and questions related to underpinning knowledge.

**Method of Assessment (Cont'd.)**

Competency should be assessed under general guidance, checking at various stages of the processes and at the completion of each activity against the performance criteria and specifications.

(6) Context of Assessment

Competency should be assessed in the workplace or simulated workplace setting.

Assessment should be while tasks are undertaken either individually or as part of a team under limited supervision.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> Establishes principles and procedures Evaluates and reshapes process Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BCM CSS0073A: Co-ordinate the placement of concrete

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively co-ordinate the handling, placing, compacting, testing, curing and quality control of concrete and applies to supervisors and foremen working in the construction industry.

Competency Field: General Construction

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare work	<ul style="list-style-type: none"> 1.1 Quality Assurance requirements for company's concrete operations recognised and adhered to. 1.2 OH&S requirements with application tasks and workplace environment recognised and adhered to, including identification of hazardous material. 1.3 Accurate information relating to the required resources is available for use by self and workers. 1.4 Appropriate corrective actions taken to rectify incorrect or incomplete information. 1.5 The required quantity and quality resources are stored and available for use by self and workers. 1.6 Work procedures and the role individuals are explained to workers.
2. Co-ordinate the placement of concrete to structures	<ul style="list-style-type: none"> 2.1 Concrete mixed according to worksite procedure and meets engineer's specifications and/or job requirements. 2.2 The appropriate and relevant concrete tests carried out according to organisation's methods and procedures. 2.3 Arrangement for handling, lifting or hoisting and placing concrete conform to job requirements. 2.4 Concrete transported and discharged safely and efficiently according to worksite method and procedure. 2.5 Location of concrete placement defined from drawings and specifications, checked and confirmed ready to receive poured concrete.

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| | 2.6 | Placement of concrete co-ordinated in a manner to ensure correct height, avoid segregation, achieve desired finish and to minimise waste and spillage. |
| | 2.7 | Poured concrete consolidated during process using appropriate compaction or vibration method to specifications. |
| 3. | Cure concrete | 3.1 Concrete cured to engineer's approval and in accordance with the National Building Codes and standard practice in concrete on building. |
| | 3.2 | Curing agent/method maintained on concrete surface to specifications and, where applicable, in accordance with standards for Liquid Membrane Forming Curing Compounds for Concrete. |
| | 3.3 | Protection provided to concrete during curing process by appropriate material, isolating and/or barricading area. |
| 4. | Co-ordinate clean-up of site | 4.1 Appropriate action taken to ensure that waste and unwanted material disposed of safely according to site and environmental requirements. |
| | 4.2 | Tools and equipment cleaned, maintained and stored according to organisation's requirements. |

RANGE STATEMENT

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

Quality Assurance requirements may include:

- workplace operations and work procedures
- quality of material
- control of placement, compaction and finish of concrete
- use and maintenance of tools, plant and equipment
- specifications of work

OH&S requirements to be in accordance with Statutory Legislation and regulations and may include:

- protective clothing and equipment
- workplace environment and safety
- working platforms
- use of tools and equipment
- emergency procedures

Work information/instruction/specification include:

- drawings
- technical literature
- relevant building standards/regulations
- oral and written instructions
- organisational requirements
- legal requirements
- manufacturer's instructions
- security requirements

Tools and equipment may include:

- shovels and rakes
- wooden floats
- steel floats
- bull floats
- immersion vibrator or vibrating table
- tarpaulins/covers
- curing agent applicator
- steam generator
- wheelbarrow
- tamping rods
- screed boards
- edging tool
- brooms

Concrete work includes placement of concrete onto:

- foundation
- slab and decking
- retaining walls

Relevant concrete tests include:

- slump test for water content
- preparing cylinders/cube compression for testing

Required resources include:

- chute, skip, pump
- aggregates, cements, additives
- formwork, membranes
- anti-heave materials
- cube moulds and sump test equipment
- poker vibrators
- tampers and floats
- curing materials and spray compounds
- hand tools, portable tools and equipment

Personal protective equipment may include:

- safety goggles/glasses
- respirators
- ear muffs and safety boots
- boots
- water proof pants and jacket

Corrective actions include:

- reporting and rectifying discrepancies
- complying with company procedures
- rectifying workability and grade of concrete
- warning others of present or impending dangers

Concrete may be transported to placement area and placed by the following methods:

- directly from pre-mix truck
- wheelbarrow
- buckets
- shovels

Concrete may be cured by:

- atmospheric conditions
- applied moisture
- applied agents

Concrete may be finished by:

- steel float
- bull floats
- wood float
- broom

Waste material and debris may include:

- concrete spillage
- excess concrete
- pieces of timber
- empty containers
- cardboard and paper

Work practices to include:

- follow company instructions and procedures and official guidance
- co-ordinate concrete work with works of other trade areas
- co-ordinating the placement of concrete to structures by measuring, receiving, placing, compacting, finishing, protecting and curing
- co-ordinate the use and maintenance of hand and power tools and equipment
- adapting safe working practices
- complete documentation
- co-ordinating cleaning up and disposing of waste
- co-ordinating the storage and security of tools, equipment and materials

EVIDENCE GUIDE

Competency is to be demonstrated by co-ordinating activities for safe and effective placement, finishing and curing of concrete in any of the conditions and types of structures listed within the range statement, relevant to the work orientation.

(1) Critical Aspects and Evidence

It is essential that competence be observed in the following aspects:

- Demonstrate compliance with Occupational Health and Safety regulations applicable to concrete work and workplace operations.
- Show compliance with organisational policies and procedures including Quality Assurance requirements.
- Interpret information relevant for the placement of concrete to the range of structures.
- Demonstrated ability to plan, organise and adopt safe and healthy working practices.
- Demonstrated ability to co-ordinate the selection and preparation of materials, tools and equipment.
- Demonstrated ability to co-ordinate the placement, testing, compaction, finishing, curing and protection of concrete.
- Demonstrated ability to provide technical advice and leadership to workers.
- Interactively communicate to support team and ensure safe and effective workplace operations
- Give particular attention to placement of reinforcement and compaction and curing processes of concrete.

(2) Pre-requisite Relationship of Units

Pre-requisite for this unit is:

- Nil

(3) Underpinning Knowledge and Skills**Knowledge**

Knowledge of:

- workplace and equipment safety requirements
- information relating to drawings, specifications, schedules
- names, characteristics, uses and limitations of materials relating to the concreting process
- defects, workability, durability, quality and appearance of materials
- types, uses, limitations of hand and power tools and equipment
- defects in materials and equipment which are caused naturally, by manufacture, by workmanship and by the environment
- calculations for quantities and measurements relevant to concrete work
- methods of sampling concrete and of testing workability and strength of concrete
- methods of placing, compacting, finishing and curing concrete
- reasons for compacting and curing concrete
- construction joints
- methods of identifying hazards when placing concrete
- materials handling, transporting and placing of concrete
- formwork and reinforcement component

Skills

The ability to:

- read and interpret technical documents
- identify contract requirements
- select equipment appropriate to concreting process
- report writing
- oral and written communication
- measure and calculate dimensional specifications
- decision making

(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment. If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments.

Resources may include:

- a real or simulated environment
- project resources
- organisation policies and guidelines
- access to relevant resource personnel
- relevant legal and statutory documentation
- hand tools and power tools appropriate to concreting process
- plant and equipment appropriate to concreting process
- suitable formwork with placed reinforcement appropriate to concreting process
- concrete testing equipment

(5) Method of Assessment

Assessment against this unit may involve the following:

Continuous assessment in a setting that stimulate the conditions of performance described in the elements, performance criteria and range statements that make up this unit,

Self-assessment on the same terms as those described above

Simulated assessment or critical incident assessment, provided that the critical incident involves assessment against performance criteria and an evaluation of underpinning knowledge and skill required to achieve the required performance outcomes

(6) Context of Assessment

For valid and reliable assessment of this unit, the competency should be demonstrated over a period of time and observed by the assessor.

The competency is to be demonstrated in a range of situations, which may include involvement in related activities normally experienced in the workplace.

Evidence of underpinning knowledge understanding of processes and principles can be gained through thorough questioning and by observation of previous work.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1	Level 2	Level 3
<ul style="list-style-type: none"> • Carries out established processes • Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> • Manages process • Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> • Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.