NATIONAL OCCUPATIONAL SKILLS STANDARDS FOR SURVEYOR

Department of Occupational Standards
Ministry of Labour and Human Resources
Thimphu, Bhutan.
December 2010

First Publication 2010

FOREWORD

The Department of Occupational Standards of the Ministry of Labour and Human Resources proudly presents National Occupational Skills Standards (OSS) for Surveyor as part of TVET reform initiative for improving the quality of Technical Vocational Education and Training System in Bhutan. The standards represent the fruits of hard work and invaluable experiences gained by the department since its establishment in the latter half of 2003. The main aim of developing Occupational Skills Standards is to set up a well defined nationally recognized Technical Vocational Qualification and Certification system that will help set a benchmark for the Technical Vocational Education and Training (VET) System in our country aligned to international best practices.

Occupational Skills Standards is one of the base pillars in the Bhutan Vocational Qualification Framework (BVQF) and is the first step in its implementation. The standards are developed to ensure that employees or vocational graduates possess and acquire the desired skills, knowledge and attitude required by industries and employers. In order to ensure this close match in supply and demand of skills, knowledge and attitude, standards have been developed in close consultation and partnership with industry experts and validated by the Technical Advisory Committees for the concerned economic sectors.

A vocational education and training system based on Occupational Skills Standards shall ensure that delivered training is of a high quality and relevant to the needs of the labour market. As a result, future TVET graduates will be better equipped to meet the need and expectations of industries and employers. This positive impact on the employability of

TVET graduates will enhance the reputation of vocational education and training and make it attractive to school leavers.

While acknowledging the existing level of cooperation and collaboration, the ministry earnestly requests employers and training providers to extend the fullest support and cooperation in implementing the Occupational Skills Standards. The ultimate objective is to build a competent and productive national workforce that will contribute to the continued socio-economic progress of our country.

I gratefully acknowledge the valuable contributions made by experts from industries during the consultation, verification and validation processes of the standards. I look forward to improved engagement and active participation of the industry and employers in the development of a quality assured demand driven TVET system in the near future.

Dorji Wangdi
Minister
Ministry of Labour & Human Resources

INTRODUCTION

A. Occupational Skills Standards (OSS)

Occupational Skill Standards specify the skill, knowledge and attitude applied to a particular occupation. Standards also specify the standards or criteria of performance of a competent worker and the various contexts in which work may take place. Standards provide explicit advice to assessors regarding the skill and knowledge to be demonstrated by candidates seeking formal recognition either following training or through work experience.

Purpose of Occupational Skills Standards

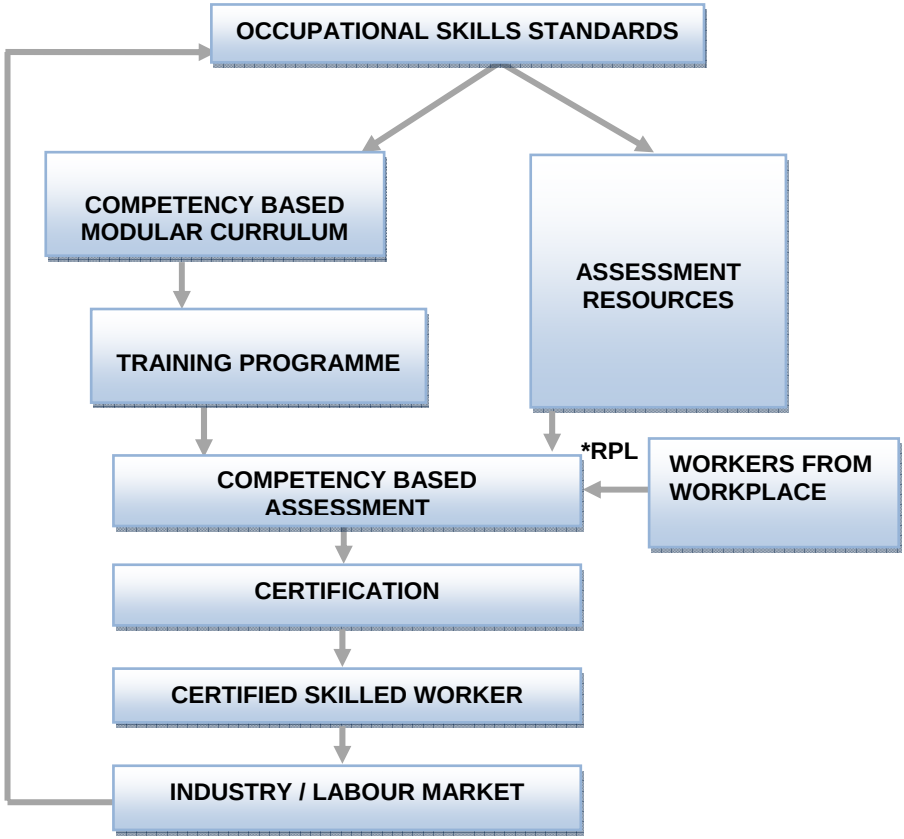
Skill Standards serve a number of purposes including:

- Providing advice to curriculum developers about the skill and knowledge to be included in curriculum.
- Providing specifications to assessment resource developers about the skill, knowledge and attitude within an occupation to be demonstrated by candidates.
- Providing advice to industry/employers about job functions, which in turn can be used for the development of job descriptions, performance appraisal systems and work flow analysis.

B. Bhutan Vocational Qualification Framework (BVQF)

Bhutan Vocational Qualifications Framework is an agreed system of Assessing, Certifying and Monitoring nationally recognized qualifications for all learning in the VET sector against national standards, in training institutions, in the workplace, in schools or anywhere where learning takes place.

Components of the Bhutan Vocational Qualification Framework (BVQF)



*** RPL = Recognition of Prior Learning**

BVQF Levels

The Bhutan Vocational Qualification Framework has three levels classified based on the competency of the skilled workers. The three levels are:

- National Certificate Level 3 (NC III) - Master Craftsman
- National Certificate Level 2 (NC II) - Craftsman
- National Certificate Level 1 (NC I) - Semi Skilled Worker

BVQF Level Descriptors

The qualification levels are decided based on level descriptors. The detail of the qualification level descriptor is as follows:

National Certificate Level 1 (Semi skilled)

Carry out processes that:	Learning demand:	Responsibilities which are applied:
• Are narrow in range. • Are established and familiar. • Offer a clear choice of routine responses. • Involve some prioritizing of tasks from known solutions.	• Basic operational knowledge and skill. • Utilization of basic available information. • Known solutions to familiar problems. • Little generation of new ideas.	• In directed activity. • Under general supervision and quality control. • With some responsibility for quantity and quality. • With no responsibility for guiding others.

National Certificate Level 2 (Craftsman)

Carry out processes that:	Learning demand:	Responsibilities which are applied:
• Require a range of well developed skills. • Offer a significant choice of procedures requiring prioritization. • Are employed within a range of familiar context.	• Some relevant theoretical knowledge. • Interpretation of available information. • Discretion and judgment. • A range of known responses to familiar problems.	• In directed activity with some autonomy. • Under general supervision and quality checking. • With significant responsibility for the quantity and quality of output. • With some possible responsibility for the output of others.

National Certificate Level 3 (Master Craftsman)

Carry out processes that:	Learning demand:	Responsibilities which are applied:
• Requires a wide range of technical or scholastic skills. • Offer a considerable choice of procedures requiring prioritization to achieve optimum outcomes. • Are employed in a variety of familiar and unfamiliar contexts.	• A broad knowledge base which incorporates some theoretical concepts. • Analytical interpretation of information. • Informed judgment. • A range of sometimes innovative responses to concrete but often unfamiliar problems.	• In self–directed activity. • Under broad guidance and evaluation. • With complete responsibility for quantity and quality of output. • With possible responsibility for the output of others.

PURPOSE

This suite of two qualifications is designed for people interested in a career as Surveyor.

The first of the qualification is the National Certificate in Surveyor Level 2. It provides school leavers with generic and industry specific skills and demands a level of performance that will enable new recruits to the industry to be immediately productive.

The qualification comprises one Occupational Skills Standards that cover the essential knowledge and skills to carry out levelling.
Successful completion of this qualification is a pre-requisite for entry into the Level 3 qualification.

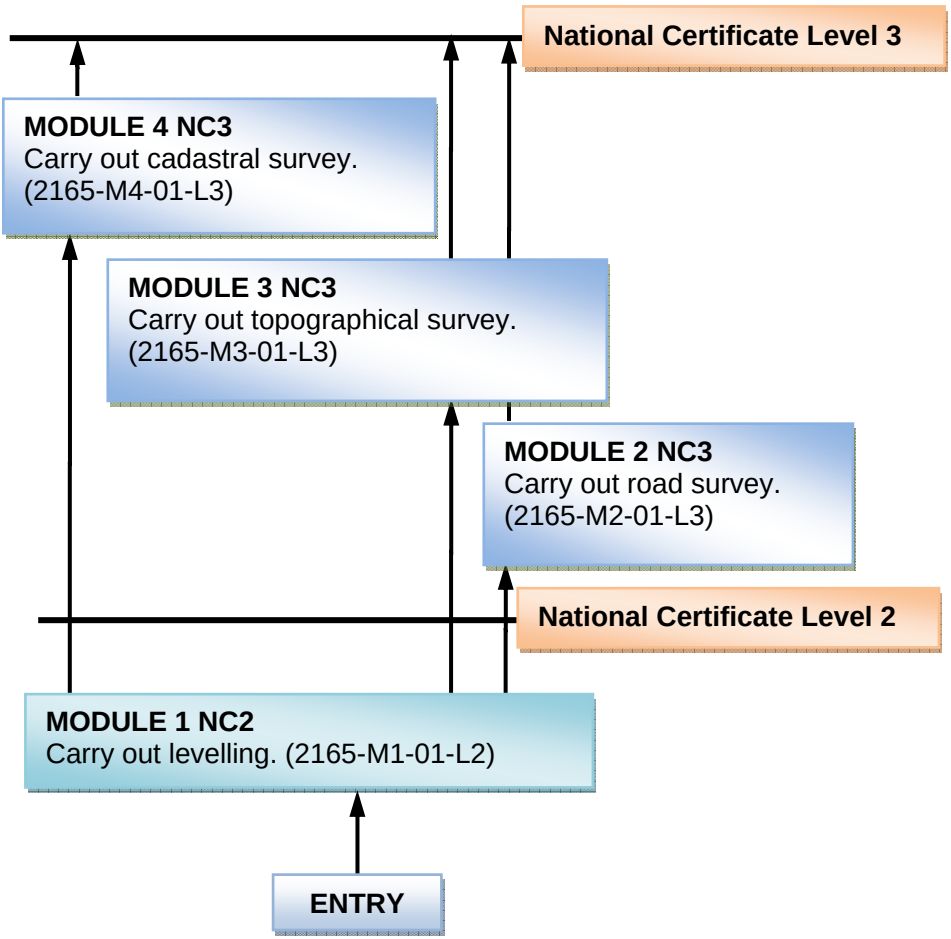
The National Certificate in Surveyor Level 3 is currently the final achievement in this qualification pathway. Candidates wishing to be admitted into training will already hold the National Certificate in Surveyor Level 2.

The Level 3 qualification recognizes the skills and knowledge required to work as a highly skilled Surveyor. The three Occupational Skills Standards included in the Level 3 National Certificate cover the knowledge and skills required to carry out road survey, topographical survey and cadastral survey.

A diagram of the qualification pathway provided by these two National Certificates follows.

PACKAGING OF QUALIFICATION FOR SURVEYOR

The Occupational Skills Standards for the Surveyor comprises four OSSs, and four stand alone modules for Surveyor. The modules and packaging of qualification for Surveyor are shown below:



CODING USED FOR OCCUPATIONAL SKILLS STANDARDS

The coding and occupation classification system developed in Bhutan is logical, easy to use, and also aligned with international best practises. The Bhutanese coding and occupation classification system is based on the International Standard Classification of Occupations, 2008 (ISCO-08) developed by the International Labour Organisation (ILO).

The coding of the occupational skills standards forms the basis of the identification code for the Vocational Education and Training Management Information System (VET – MIS) both in terms of economic sector identification and that of the individual standard.

Coding the individual occupational skills standards

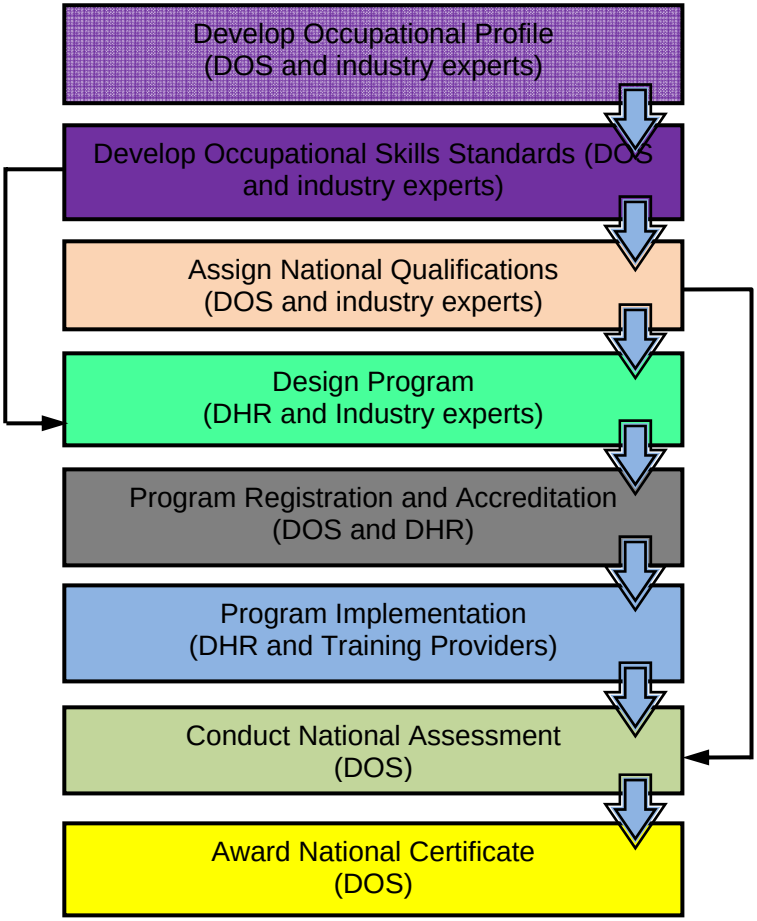
Coding the individual skills standard has a multiple purpose:

- to identify the level,
- to identify to which module the standard belongs,
- to identify in which order the standard is clustered within that module.

A job can include a number of competencies described in the occupational skills standards. For bricklaying this could be: “Ensure work safety”, “Maintain tools and equipment”, “Prepare for work”, “Carry out” concrete work”, “Perform reinforcement work” etc.
However, in order to follow a logical order, only occupational skills standards related to each other and following a logical sequence in terms of training delivery, from the simple to the complex, are clustered into a module. Some standards are so complex that they need to stand alone.

To illustrate with an example (2165-M1-01-L1), the ILO assigns the code 2165 to the occupation of Surveyor and related trades. Therefore, in the Bhutan context, the occupation Surveyor has been assigned the code 2165 in the National Coding System. The first module is assigned the code M1, the first Occupational Skills Standard clustered into the first module (M1) is designated the code 2165 M1 01. Levels are assigned the code L and follow a logical progression from the National Certificate Level 1 (NC 1) to the National Certificate Level 3 (NC 3). Therefore the National Certificate Level 1 is assigned the code L1.

Implementation and operational procedures for Occupational Skills Standard (OSS)



Key:
MoLHR – Ministry of Labour and Human Resources
DHR – Department of Human Resources
DOS – Department of Occupational Standards

NATIONAL OCCUPATIONAL SKILLS STANDARDS FOR SURVEYOR

Validation date : 1st December 2010.

Endorsement date : 8th December 2010.

Date of Review : 8th December 2013 (Max. 3 years).

Technical Advisory Committee (TAC) members for the Construction Sector involved in the validation of OSS:

1. Rebecca Gurung **(TAC Chairperson)**, Vice President, Royal Bhutan Institute of Architect, Thimphu.
2. Mahendra Chhetri, Promoter, Himalayan Engineering and Management Consultancy, Thimphu.
3. Tshering Wangdi A, Chief Engineer, Survey and Design Division, Department of Roads, MoWHS, Thimphu.
4. Tshering Wangdi B, Chief Engineer, Road Division, Department of Roads (DoR), MoWHS, Thimphu.
5. Dorji Tshering, Chief Survey Engineer, Topography Division, National Land Commission, Thimphu.
6. Sangay Dorji, Chief Survey Engineer, Cadastral Division, National Land Commission, Thimphu.
7. Karma, Principal, Construction Service Centre, Thimphu.
8. Tashi Tshering, Dy. Engineer, Construction Development Board, MoWHS, Thimphu.
9. Passang Dorji, Project Manager, School Planning & Building Division (SPBD), Department of School Education, MoE, Thimphu.
10. Chheku Dukpa, Offtg. General Secretary, Construction Association of Bhutan, Thimphu.
11. Kinley Wangmo, Assistant Programme Officer, Training and Professional Services Division, Department of Human Resources, MoLHR, Thimphu.
12. Karma Loday (**TAC Member Secretary**), Chief Programme Officer, Standards and Qualification Division, Department of Occupational Standards, MoLHR, Thimphu.

Subject experts involved during the consultative workshop of Surveyor OSS:

1. Dorji Tshering, Chief Survey Engineer, Topography Division, National Land Commission, Thimphu.
2. Dorji Tashi, Survey Engineer, National Land Commission, Thimphu.
3. Kuenzang Thinley, Survey Engineer, National Land Commission, Thimphu.
4. Hem Bahadur, Surveyor, Survey and Design Division, Department of Roads, MoWHS, Thimphu.
5. Phurba Dorji, Surveyor, Survey and Design Division, Department of Roads, MoWHS, Thimphu.
6. M. B. Gurung, Surveyor, Gagan Consultancy, Thimphu.
7. Pema Dorji, Surveyor, Lhawang Survey Consultancy, Thimphu.

Development group (Facilitator):

1. Chhimi Wangchuk, Senior Programme Officer (Facilitator), Department of Occupational Standards (DOS), MoLHR, Thimphu.

TABLE OF CONTENTS
OCCUPATIONAL SKILLS STANDARDS FOR SURVEYOR

NATIONAL CERTIFICATE - LEVEL 2

NATIONAL CERTIFICATE - LEVEL 3

SURVEYOR
OCCUPATIONAL SKILLS STANDARDS
FOR
NATIONAL CERTIFICATE LEVEL 2 (NC 2)

OSS TITLE	ELEMENTS OF COMPETENCE
Carry out levelling.	1. Conduct trigonometric levelling. 2. Conduct tertiary levelling.

OSS TITLE : **Carry out levelling.**

DESCRIPTOR : This OSS covers the competencies required to carry out trigonometric and tertiary levelling to establish elevation of stations / benchmarks.

CODE : **2165-M1-01-L2**

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Conduct trigonometric levelling.	1.1 Check required ***tools and instruments*** in accordance with standard procedures. 1.2 Locate the existing control points / benchmarks for the locality from the data base. 1.3 ***Set up the survey instruments*** following the standard procedures. 1.4 Observe and record the ***readings*** on the stations with ***necessary precautions***. 1.5 Download and process the data into PC or field computer to obtain the elevation / height information. 1.6 Report the status of stations and benchmarks to relevant national agency.
2. Conduct tertiary levelling.	2.1 Check required tools and instruments in accordance with standard procedures. 2.2 Locate the existing benchmarks for the locality from the data base. 2.3 Set up the level following the standard procedures with necessary precautions. 2.4 Observe and record the readings of the levelling staff with necessary precautions. 2.5 Download and ***process the data*** into PC or field computer to obtain the elevation / height information. 2.6 Analyze the output / results for permissible tolerance.

	2.7 Report the status of stations and benchmarks to relevant national agency.

RANGE STATEMENT
Tools and instruments may include but not limited to: • Digital plane table (Total station) • Digital level / dumpy level • Walkie Talkie • Generator • Computer / Field computer • Software (Terra model) • Camping equipment (liveries, camping gear) • Measuring tape • Binocular • Barometer • Thermometer
Set up the survey instruments may include but not limited to: • Levelling • Centering • Orientation
Readings may include but not limited to: • Temperature • Pressure • Staff reading
Necessary precautions may include: • Avoid observing the readings during bright / sunny day (after mid day) • Maintain equi-distance between back and forward sight • Stable ground for staff positions • Hold staff vertically • Check for collimation of the instruments
Process the data may include but are not limited to: • Computation and adjustments • Format conversions

ASSESSMENT GUIDE

Form of assessment

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through written form of assessment.

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipment, materials and documents.
- The candidate must complete the assessment in an accepted time frame.

Critical aspects

- Check required tools and instruments in accordance with standard procedures.
- Set up the survey instrument and process data following the standard procedures.
- Observe and record the readings of the levelling staff with necessary precautions.

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Tools and instruments uses and specifications • Software • Basic IT • Fundamentals of surveying • Basic mathematics (trigonometry) • First Aid • Calibration of instrument • Geodesy	• Safe handling of tools and instruments • Basic maintenance of tools and instruments • Reading and writing • Communication • Problem solving • Physical fitness • Good vision • Basic IT skills • Team work • First Aid

SURVEYOR
OCCUPATIONAL SKILLS STANDARDS
FOR
NATIONAL CERTIFICATE LEVEL 3 (NC 3)

OSS TITLE	ELEMENTS OF COMPETENCE
Carry out road survey.	1. Prepare for road survey work. 2. Conduct ghat tracing survey. 3. Conduct detail survey along road corridor. 4. Manage survey data. 5. Conduct batter pegging / profiling.
Carry out topographical survey.	1. Densify control points. 2. Conduct detail survey of ground features. 3. Manage survey data. 4. Execute cartographic processes and print map.
Carry out cadastral survey.	1. Demarcate parcel boundary. 2. Stake out missing peg / boundaries. 3. Establish additional control points (Traverse method). 4. Manage survey data. 5. Compute parcel area.

OSS TITLE : **Carry out road survey.**

DESCRIPTOR : This OSS covers the competencies required to carry out ghat tracing survey, detail survey, manage data and carry out batter pegging / profiling.

CODE : **2165-M2-01-L3**

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Prepare for road survey work.	1.1 Interpret plan or map according to the job requirement. 1.2 Check required ***tools and instruments*** in accordance with standard procedures. 1.3 Provide control points based on the established norms. 1.4 Carry out desktop and ***feasibility study*** according to standard procedures.
2. Conduct ghat tracing survey.	2.1 ***Set up the survey instruments*** following the standard procedures. 2.2 Fix alignment and gradient as per the points in marked plan. 2.3 Observe and record the readings on the stations. 2.4 Submit the alignment reports to concerned authorities.
3. Conduct detail survey along road corridor.	3.1 Upload the control coordinates into the survey instruments. 3.2 Set up the survey instruments following the standard procedures. 3.3 Establish additional control points following standard procedures by traverse method. 3.4 Carry out the detail survey as per the specification of clients.

	3.5 Throw adequate spot height depending on the scale and contour interval. 3.6 Download and process the data into PC or field computer to obtain the coordinate.
4. Manage survey data.	4.1 Download the data into PC or field computer according to standard procedure. 4.2 ***Process the data*** using ***certain software*** according to standard procedures. 4.3 Generate contours / Digital Elevation Model (DEM) as per requirements. 4.4 Convert the data format based on the requirement of clients. 4.5 Submit documents / reports to concerned personnel (Road Designer) according to the company's procedures. 4.6 Report the status of stations and benchmarks to relevant national agency.
5. Conduct batter pegging / profiling.	5.1 Upload batter coordinates to the survey instruments. 5.2 Set up the survey instruments following the standard procedures. 5.3 Stake out the position based on the uploaded coordinates. 5.4 Peg the stake out position for determining the earth work quantities for subsequent excavation and filling.

RANGE STATEMENT
Tools and instruments may include but not limited to: • Digital plane table (total station) • Walkie Talkie • Generator • Field computer • Computer • Thermometer • Barometer • Calculator • Thread • Binocular • Magnetic compass • Clinometers / abnilevel / ghat tracer • Measuring tape • Oil paint • Knife • Umbrella
Feasibility study may include but not limited to: • Walking along the alignment • Seeing settlement and ownership • Seeing the terrain and stability • Seeing vegetation
Set up the survey instruments may include: • Levelling • Centering • Orientation
Process the data may include but are not limited to: • Editing • Adjustments • Format conversions
Detail survey specification may include: • Contour interval • Details to be picked up
Certain software may include but not limited to: • LISCAD • Auto CAD • Terra model • Geo com • Flex office

ASSESSMENT GUIDE

Form of assessment

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through written form of assessment.

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipment, materials and documents.
- The candidate must complete the assessment in an accepted time frame.

Critical aspects

- Check required tools and instruments in accordance with standard procedures.
- Set up the survey instruments and process data following the standard procedures.
- Carry out the detail survey as per the specification of clients.
- Throw adequate spot height depending on the scale and contour interval.
- Stake out the position based on the uploaded coordinates.

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Tools and instrument uses and specifications • Software • Basic IT • Fundamentals of surveying • Basic mathematics (trigonometry) • Plane table surveying • Levelling • Introduction to GIS • Occupational Health and Safety Regulation • First aid • Basic engineering survey • Road Act • Environment Act • Land Act • Nature conservation Act	• Safe handling of tools and instruments • Reading and writing • Communication • Problem solving • Physical fitness • Good vision • Basic IT skills • Team work • Handle first aid emergencies • Public dealings

OSS TITLE : **Carry out topographical survey.**

DESCRIPTOR : This OSS covers the competencies required to carry out large scale topographical survey and execute cartographic processes and print maps.

CODE : **2165-M3-01-L3**

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Densify control points.	1.1 Check required ***tools and instruments*** in accordance with standard procedures. 1.2 Identify the area to be surveyed according to the requirement of clients. 1.3 Extract the control points of the area to be surveyed from the data base. 1.4 Locate the control points on the ground. 1.5 ***Set up the survey instruments*** following the standard procedures. 1.6 Observe and record the readings on the stations. 1.7 Download and process the data into PC or field computers to obtain the coordinate.
2. Conduct detail survey of ground features.	2.1 Upload the control coordinates into the survey instruments. 2.2 Set up the survey instruments following the standard procedures. 2.3 Establish additional control points following standard procedures by traverse methods. 2.4 Carry out the detail survey as per the ***detail survey specification*** of clients. 2.5 Throw adequate spot height depending on the scale and contour interval.

3. Manage survey data.	3.1 Download the data into PC or field computer. 3.2 ***Process the field data*** using ***certain software*** according to standard procedures. 3.3 Generate contours / Digital Elevation Model (DEM) based on the requirement of clients. 3.4 Convert the data format based on the requirement of clients. 3.5 Document and report the work done in accordance with standard procedures. 3.6 Back-up the data according to standard procedures. 3.7 Report the status of stations and benchmarks to relevant national agency.
4. Execute cartographic processes and print map.	4.1 Symbolize the different features according to national standard. 4.2 Generalize the map to enhance its legibility. 4.3 Prepare the map layout and design according to standards. 4.4 Add ***annotation*** to make the map more informative. 4.5 Carry out proof print and make correction, where necessary. 4.6 Print the maps according to standard procedure.

RANGE STATEMENT
Tools and instruments may include but not limited to: • Digital plane table (total station) • Walkie Talkie • Generator • Computer / Field computer • Thermometer • Barometer • GNSS receiver • Binocular • RK-1 and Plane table set • Planimeter • Camping equipment (liveries, camping gear) • Plotter • Chart paper / drawing sheet • Magnetic compass
Set up the survey instruments may include but not limited to: • Levelling • Centering • Orientation
Detail survey specification may include but not limited to: • Scale • Contour interval • Details to be picked up
Process the field data may include but are not limited to: • Adjustments • Checking for conformity to data model • Format conversions • Editing
Certain software may include but not limited to: • LISCAD • Auto CAD • Terra model • Cartographic software • Geo com • ARCGIS • Flex office
Annotation may include but not limited to: • Name of places • Name of geographical features • Other textual data information • Descriptive information • Spot height and contour values

ASSESSMENT GUIDE

Form of assessment

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through written form of assessment.

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipment, materials and documents.
- The candidate must complete the assessment in an accepted time frame.

Critical aspects

- Check required tools and instruments in accordance with standard procedures.
- Set up the survey instruments and process the data following the standard procedures.
- Carry out the detail survey as per the survey specification of clients.
- Throw adequate spot height depending on the scale and contour interval.

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Tools and instruments uses and specifications • Software • Basic IT • Basic cartography • Scanning / digitization • Map projection • Fundamentals of surveying • Basic mathematics (trigonometry) • Plane table surveying • Levelling • Trigonometric levelling • Basic Global Navigation Satellite System (GNSS) • Basic photogrammetry • Basic Remote Sensing • Basic Geodesy • Introduction to GIS • Occupational Health and Safety (OHS) Regulation • First Aid	• Safe handling of tools and instruments • Reading and writing • Communication • Problem solving • Physical fitness • Good vision • Basic IT skills • Team work • First aid

OSS TITLE : **Carry out cadastral survey.**

DESCRIPTOR : This OSS covers the competencies required to carry out cadastral survey for land registration based on the Land Acts, rules and regulations and other legal provisions.

CODE : **2165-M4-01-L3**

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Demarcate parcel boundary.	1.1 Check required ***tools and instruments*** in accordance with standard procedures. 1.2 Coordinate with the local government authorities and adjoining land owner in accordance with Land Act, rules and regulations. 1.3 Locate the existing control points for the locality from the database. 1.4 Set up the survey instruments following the standard procedures. 1.5 Survey the boundaries and necessary details in accordance with standard procedures. 1.6 Assign parcel identifier based on existing conventions. 1.7 Fix the boundary pegs as per the set standards. 1.8 Document and report the work done in accordance with standard procedures.
2. Stake out missing peg / boundaries.	2.1 Check required tools and instruments in accordance with standard procedures 2.2 Coordinate with the local government authorities and adjoining land owner in accordance with Land Act, rules and regulations.

	2.3 Locate the existing control points for the locality from the database. 2.4 Set up the survey instruments following the standard procedures. 2.5 Upload the coordinates of missing pegs / boundary points. 2.6 Stake out and fix the boundary points within prescribed tolerance.
3. Establish additional control points (Traverse method).	3.1 Identify the known control stations from the database. 3.2 Recce and locate control points on the ground. 3.3 Set up the survey instruments following the standard procedures. 3.4 Establish additional control points following standard procedures, where necessary by traverse method. 3.5 Adjust the error as per the standard procedures.
4. Manage survey data.	4.1 Import the data from cadastral geo database and upload into the digital plane table. 4.2 Download the field data into PC or field computer. 4.3 ***Process the field data*** using ***certain software*** according to standard procedures. 4.4 Convert the data format based on the requirement of clients / users. 4.5 Export data to cadastral geo database. 4.6 Report the status of stations and benchmarks to relevant national agency.
5. Compute parcel area.	5.1 Check the integrity of the polygon according to the standard procedures. 5.2 Generate the parcel area for the legal registrations.

	5.3 Extract coordinates of critical boundary points based on land rules and regulation. 5.4 Get endorsement of the computed area by the concerned authorities. 5.5 Compile and submit report to ***concerned authorities***.

RANGE STATEMENT	
Tools and instruments may include but not limited to:	
• Digital plane table (total station) • Walkie Talkie • Generator • Field computer / Computer • Generator • Boundary pegs	• RK-1 and Plane table set • Planimeter • Camping equipment (liveries, camping gear) • Measuring tape
Process the field data may include but are not limited to:	
• Checking for conformity to data model • Editing	• Format conversions • Adjustments
Certain software may include but not limited to:	
• LISCAD • Auto CAD • Terra model	• Geo com • ARCGIS • Flex office
Concerned authorities may include but not limited to:	
• Dzongkhags • National Land Commission (NLC) • Ministry of Home and Culture Affairs (MoHCA)	• Ministry of Agriculture and Forest (MoAF) • Thromdes • Ministry of Economic Affairs (MoEA)

ASSESSMENT GUIDE

Form of assessment

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through written form of assessment.

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipment, materials and documents.
- The candidate must complete the assessment in an accepted time frame.

Critical aspects

- Check required tools and instruments in accordance with standard procedures.
- Set up the survey instruments and process data following the standard procedures.

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
• Tools and instruments uses and specifications • Software • Basic IT • Land Act • Local government Act • Road Act • Land rules and regulations • Basic cartography • Fundamentals of surveying • Basic mathematics (trigonometry) • Land information system • Cadastral System • Understand legal aspects of cadastral surveying and land registration. • OHS regulations • Environment Acts • Parliament resolutions • Royal Kasho	• Safe handling of tools and instruments • Reading and writing • Communication • Problem solving • Physical fitness • Good vision • Basic IT skills • Team work • Public dealings