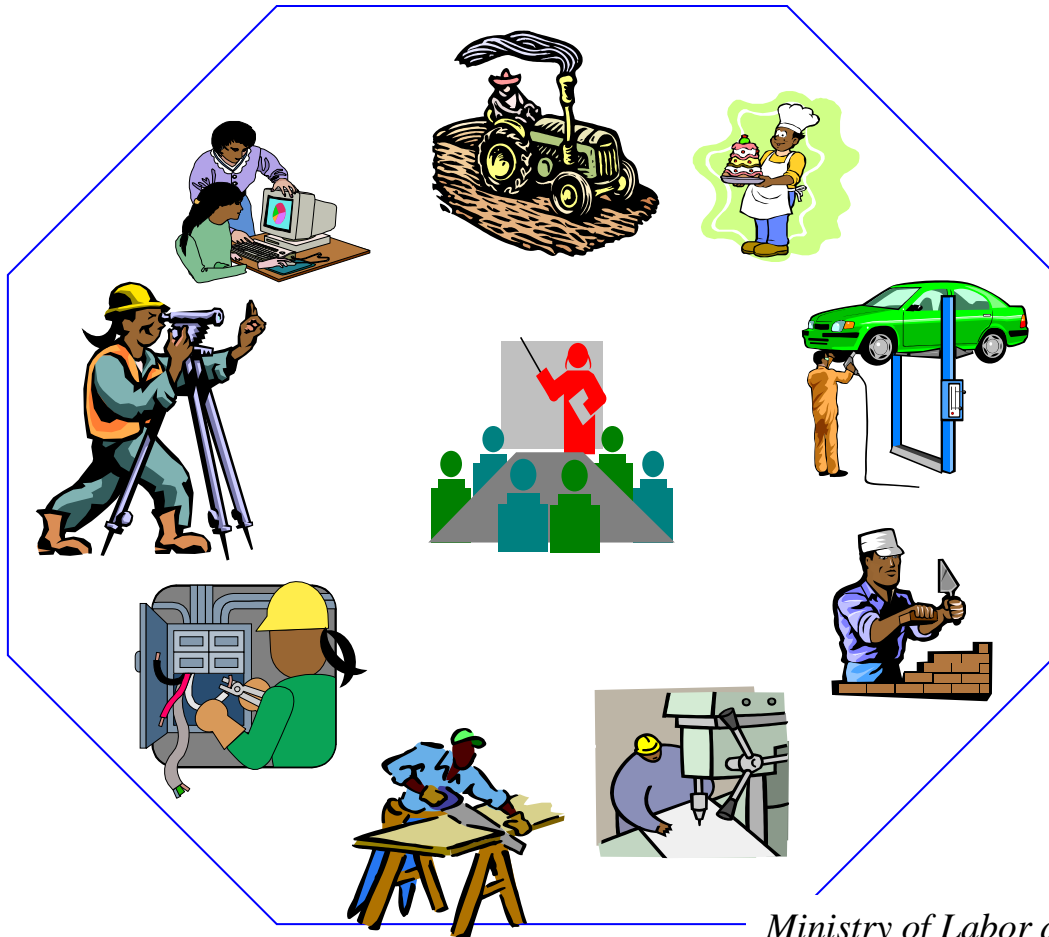




Federal Democratic Republic of Ethiopia
OCCUPATIONAL STANDARD

ROAD CONSTRUCTION AND MAINTENANCE
NTQF Level I



Ministry of Labor and skill
March 2022

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Introduction

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

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

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

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

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

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

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

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

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UNIT OF COMPETENCE CHART

Occupational Title: Road Construction and Maintenance		
Occupational Code: EIS RCM		
<i>NTQF Level I</i>		
EIS RCM1 01 0322 Read and Interpret Plans, Drawings and Specifications	EIS RCM1 02 0322 Operate Small Plants and Equipment	EIS RCM1 03 0322 Conduct Simple Sampling and Testing
EIS RCM1 04 0322 Carry-out Basic Leveling	EIS RCM1 05 0322 Implement Traffic Management Plan with Stop-Slow Bat	EIS RCM1 06 0322 Drain and De-Water Construction Site
EIS RCM1 07 0322 Conduct Labor based Earthwork	EIS RCM1 08 0322 Conduct Labor Based Gravel Pavement Work	EIS RCM1 09 0322 Carry out Chiseling, Lay Cobblestone & Block Pavement Work
EIS RCM1 10 0322 Conduct Basic Scaffolding Operations/ Formworks/Falseworks	EIS RCM1 11 0322 Apply Basic Concreting Works	EIS RCM1 12 0322 Apply Basic Masonry Works
EIS RCM1 13 0322 Conduct Road Marking and Maintenance Operation	EIS RCM1 14 0322 Apply 5s Procedures	

NTQF Level I

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Occupational Standard: Road Construction and Maintenance Level I	
Unit Title	Read and Interpret Plans, Drawings and Specifications
Unit Code	<u>EIS RCM1 01 0322</u>
Unit Descriptor	This unit covers the knowledge, attitudes and skills required in reading and interpreting of plans, drawings and specifications in the road construction industry. It includes: identifying types of drawings and their functions; recognizing amendments and commonly used symbols and abbreviations; locating and identifying key features on a site plan; and reading and interpreting job specifications.

Element	Performance Criteria
1. Identify types of drawings	1.1 Identify the main types of plans and <i>drawings</i> used in the industry and their functions 1.2 Identify the key functions of each type of drawing 1.3 Recognize and adhere to quality requirements of Company operations 1.4 Identify environmental controls from the job plans, specifications and environmental plan
2. Check changes to drawing	2.1 Check title panel to verify latest amendments to drawing 2.2 Check amendments to <i>specifications</i> to ensure Currency of information
3. Locate and identify key features on a site plan	3.1 Recognize civil construction symbols and abbreviations 3.2 Locate and correctly interpret legend on project and drawings, abbreviations symbol 3.3 Achieve orientation of the plan with the site 3.4 Identify and locate <i>key features</i> of the site 3.5 Gain access to site and identify services, features, contours and datum
4. Read and interpret job specifications	4.1 Job specifications are identified from drawings, notes and descriptions 4.2 Standards of work, finishes and tolerances are identified from the project specifications 4.3 Material attributes are identified from specifications

Variable	Range
Drawings	May include: <ul style="list-style-type: none"> • Site plans

	<ul style="list-style-type: none"> • Locality plans • Cross sectional plans • Longitudinal plans • Structural detail and specification providing illustrations and dimensions and project plans • Drawings • Specifications • Illustrations • dimensions and notes
Specifications	<p>May include:</p> <ul style="list-style-type: none"> • Materials and quality of work • Quality assurance • Nominated sub-contractors • Provision of site access/facilities • Details relating to performance including: • Standards of work • Tolerances • Material types • Characteristics • Treatments and finishes
Key features	<p>May include:</p> <ul style="list-style-type: none"> • Type of product/service • Quantities and sizes • Characteristics and pattern dimension • Location • Surfaces and compatibility

Evidence Guide	
Critical aspects of competence	<p>Must demonstrate knowledge, skill and attitude on:</p> <ul style="list-style-type: none"> • The requirements, procedures and instructions for reading and interpreting of plans and specifications • Implemented the requirements, procedures and techniques for the safe, effective and efficient completion of the reading and interpreting of plans and specifications • Worked with others to undertake and complete the reading and interpreting of plans and specifications that meet all of the required outcomes

	<ul style="list-style-type: none"> • Consistent timely completed the reading and interpreting of plans and specifications that safely, effectively and efficiently met the required outcomes
Required Knowledge	<p>Must demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Features of plans and elevations including direction, scale, key, contours, symbols and abbreviations • Commonly used civil construction symbols and abbreviations • Processes for application of scales in plan preparation/ interpretation • Techniques for orienting/confirming the orientation of a plan • Key features of formal job specifications • Site and equipment safety requirements • Project quality requirements; JSA's/Safe work method statement • Basic calculations of heights, areas, volumes and grades • Civil construction terminology • Drawing conventions
Required Skills	<p>Must demonstrates skills to :</p> <ul style="list-style-type: none"> • Apply legislative, organization and site requirements and procedures • Speak clearly and directly, listening carefully to instructions and information • Apply teamwork to a range of situations, particularly in a safety context • Solve problems such as recognizing clear discrepancies between the documents (drawing, plan, specifications) and the actual site and taking action to correct these • Show initiative in adapting to changing work conditions or contexts particularly when • Work across a variety of work areas • Manage time (in organizing priorities and planning work) • Take responsibility for self-organization of work priorities • Apply mathematical skills, including basic calculations of heights, areas, volumes and grades • Use workplace technology including the use of communication systems and the reporting/recording of results
Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> • Workplace or fully equipped assessment location with necessary tools, equipment and consumable materials

Methods of Assessment	Competence may be assessed through: <ul style="list-style-type: none"> • Observation/Demonstration • Interview/Oral Questions/Written exam
Context of Assessment	Competence may be assessed in the workplace or in simulated workplace environment

Occupational Standard: Road Construction and Maintenance Level I	
Unit Title	Operate Small Plants and Equipment
Unit Code	<u>EIS RCM1 02 0322</u>
Unit Descriptor	This unit covers the knowledge, attitudes and skills required in operating of a range of small plant and equipment in resources and infrastructure industries. It includes the planning and preparation for work, the conducting of pre-operational checks, the use of plant and/or equipment, and carrying out operator maintenance and cleaning up.

Element	Performance Criteria
1. Plan and prepare	<p>1.1 Access, interpret and apply compliance documentation relevant to operate small plant and equipment</p> <p>1.2 Obtain, confirm and apply <i>work instructions</i> for the allotted task</p> <p>1.3 Obtain, confirm and apply to the allotted task <i>safety requirements</i> from the site safety plan and organizational policies and procedures</p> <p>1.4 Select plant, tools and equipment to carry out tasks are</p> <p>1.5 consistent with the requirements of the job</p> <p>1.6 Identify, confirm and apply to the allotted task <i>environmental protection requirements</i> from the <i>project</i> environmental management plan</p>
2. Conduct pre-operational checks	<p>2.1 Select fuel and lubricants according to manufacturer's specifications</p> <p>2.2 Check and adjust fuel, oil, hydraulic fluid and water levels</p> <p>2.3 according to manufacturer's manual</p> <p>2.4 Secure/tighten and maintain bolts, nuts, guards and attachment couplings in accordance with manufacturer's instructions</p> <p>2.5 Check and adjust function of controls and gauges where necessary to comply with manufacturer's manual</p> <p>2.6 Conduct standard start-up and shutdown procedures according to requirements of operator's manual</p>
3. Use small plant and equipment	<p>3.1 Identify site hazards associated with <i>small plant and equipment</i> operations and establish appropriate controls in accordance with the requirements of the site safety plan</p> <p>3.2 Identify and apply operating techniques for small plant and equipment to achieve optimum output in accordance with manufacture's design specifications while maintaining specified</p>

	<p>tolerances</p> <p>3.3 Operate machine to produce results within design specifications to meet specified tolerances</p> <p>3.4 Safely locate plant and equipment when not in immediate use</p>
4. Carry out operator maintenance	<p>4.1 Shutdown plant/equipment and prepare it for operator maintenance as per manufacturer's manual and organizational requirements</p> <p>4.2 Conduct inspection and fault finding in accordance with the manufacture's specifications and/or organizational requirements</p> <p>4.3 Remove and replace defective parts safely and effectively according to manufacturer's manual and organizational requirements</p> <p>4.4 Carry out regular programmed maintenance tasks in accordance with the manufacturer's and/or organizational requirements</p>
5. Clean up	<p>5.1 Clear work area and dispose of or recycle materials in accordance with project environmental management plan</p> <p>5.2 Clean, check, maintain and store plant, equipment and tools in accordance with manufacturer's recommendations and standard work practices</p>

Variable	Range
Work instructions	<p>May include:</p> <ul style="list-style-type: none"> • Verbal or written and graphical instructions, signage, work schedules/plans/specifications, work bulletins, charts and hand drawings, memos, materials safety data sheets (MSDS) and diagrams or sketches • Plans and specifications • Quality requirements, including dimensions, tolerances, • Standards of work and material standards • Safe work procedures related to the operation of small • Plant and equipment on construction sites

Safety requirements	<p>May include:</p> <ul style="list-style-type: none"> • Protective clothing and equipment • Use of tools and equipment • Workplace environment and safety and handling of materials • Use of firefighting and first aid equipment • Hazards and risks control, including: uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, traffic, embankments, excavations and cuttings, structures and hazardous materials and substances • Safe operating procedures • Underground and overhead services • Other machines • Personnel restricted access barriers • Traffic control • Working at heights • Working in proximity to others • Worksite visitors and the public • Emergency procedures, including - emergency shutdown and stopping, extinguishing equipment fires, organizational first aid requirements and evacuation
Environmental protection requirements	<p>May include:</p> <ul style="list-style-type: none"> • Organizational/project environmental management plan • Waste management • Water quality protection • Noise, vibration and dust management and clean-up management
Small plant and equipment	<p>May include the use of:</p> <ul style="list-style-type: none"> • Compressors, concrete mixers, pedestrian rollers, water pumps, brick/masonry saws, jack hammers, kanga hammers • Generator sets, lighting sets, vibrating plates, plate compactors, quick cut saws, concrete vibrators, pedestrian rollers, concrete saws and generators, industrial wet and dry vacuum cleaners • Pallet trolleys, terrazzo grinders, hoists, brush-cutters and mowers
Operator maintenance	<p>Include:</p> <ul style="list-style-type: none"> • Cleaning • Authorized servicing • Monitoring, recording and reporting of faults • Conduct of authorized minor replacements
Materials	<p>May include:</p>

	<ul style="list-style-type: none"> • Water, timber, fuels and oils • clays, silts, stone, gravel, mud, rock sand, topsoil • bituminous mixes • power leads • replacement parts and consumables
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Evidence Guide	
Critical aspects of competence	<p>Must demonstrate knowledge, skills and attitude of:</p> <ul style="list-style-type: none"> • The requirements, procedures and instructions to operate small plant and equipment • Implementation of requirements, procedures and techniques for the safe, effective and efficient operating of small plants and equipment • Working with others to operate small plants and equipment that meets all of the required outcomes • Consistent timely operating of small plants and equipment that safely, effectively and efficiently meets the required outcomes
Required Knowledge	<p>Must demonstrate knowledge on:</p> <ul style="list-style-type: none"> • Small plant and equipment types, characteristics, technical capabilities and limitations • Basic soil types and characteristics • Site and equipment safety requirements • Small plant and equipment operating techniques related to essential tasks • Operational, maintenance and basic diagnostic procedures • Site isolation and traffic control responsibilities and authorities • Materials safety data sheets (MSDS) and materials handling methods • Project quality requirements • Industry and site-specific terminology • Safe work method statement
Required Skills	<p>Must demonstrates skills to:</p> <ul style="list-style-type: none"> • Apply legislative, organization and site requirements and procedures • Apply clear and direct speaking and active listening skills • Apply teamwork to a range of situations, particularly in a safety context • Apply problem solving techniques, particularly in teams and in

	<p>dealing with safety issues</p> <ul style="list-style-type: none"> • Interpret and apply information • Show initiative in adapting to changing work conditions or contexts particularly when working across a variety of work placements • Manage time (organizing priorities and planning work) • Take responsibility for self-organization of work priorities
Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> • Workplace or fully equipped assessment location with necessary tools, equipment and consumable materials
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Observation/Demonstration • Interview/Oral Questions/Written exam
Context of Assessment	<p>Competence may be assessed in the workplace or in simulated workplace environment</p>

Occupational Standard: Road Construction and Maintenance Level I	
Unit Title	Conduct Simple Sampling and Testing
Unit Code	<u>EIS RCM1 03 0322</u>
Unit Descriptor	This unit covers the knowledge, attitudes and skills required to conduct simple construction material sampling & testing operations. It includes the planning and preparation for work, taking samples, conduct material testing, conduct preparation of stabilized construction materials, identifying hazards and risks and controlling hazards and risks.

Element	Performance Criteria
1. Prepare for sampling	<p>1.1 Work instructions, including plans, specifications, quality requirements and operational details are obtained, confirmed and applied to the allotted task</p> <p>1.2 Safety requirements are obtained from the working place safety plan and organizational policies and procedures, confirmed and applied to the allotted task</p> <p>1.3 Construction materials to be used and handling procedures to be employed are determined according to specifications</p> <p>1.4 Plant, tools and equipment selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults are rectified reported</p> <p>1.5 Environmental protection requirements are identified from the organization environmental management plan, confirmed and applied to the allotted task</p>
2. Take sample	<p>2.1 Suitable clean containers and sampling tools are obtained</p> <p>2.2 Sample is taken in accordance with approved procedure/job instructions/standards/ sampling methods</p> <p>2.3 Sample is handled, labeled and stored in accordance with approved procedure/job instructions/standards/ sampling methods</p> <p>2.4 OHS procedures for obtaining and handling samples are adhered to throughout the process including handling hazards and risks</p> <p>2.5 Necessary reports and documentation are accomplished in accordance with organization standards and format.</p>

3. Conduct material testing	<p>3.3 Hazards associated with testing operations are identified and safe operating techniques are used to minimize risk</p> <p>3.4 Operating techniques in the use of <i>testing equipment</i> are identified and applied to achieve optimum output in accordance with manufacturers’ design specifications while achieving specified tolerances</p> <p>3.5 Operations of <i>field and laboratory</i> tests are carried out in accordance with the work specific requirements.</p>
4. Conduct preparation of stabilized construction materials	<p>4.1 Proper handling of construction materials and additives (stabilizers) used for the preparation of the mix.</p> <p>4.2 Site hazards associated with the preparation of stabilized construction materials are identified and safe operational techniques are used to minimize risk.</p> <p>4.3 Preparation techniques for stabilized construction materials are identified and applied to achieve optimum output in accordance with technical specification.</p>
5. Identify hazards and risks	<p>5.1 Safety regulations and workplace safety and hazard control practices and procedures are clarified based on organization procedures</p> <p>5.2 Hazards/risks in the workplace and their corresponding indicators are identified to minimize or eliminate risk to co-workers, workplace and environment in accordance with organization procedures</p> <p>5.3 Contingency measures during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures</p>
6. Control hazards and risks	<p>6.1 Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed</p> <p>6.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OHS policies</p> <p>6.3 <i>Personal protective equipment (PPE)</i> is correctly used in accordance with organization OHS procedures and practices</p> <p>6.4 Appropriate assistance is provided in the event of a workplace emergency in accordance with established organization protocol</p>

Variable	Range
Samples	May include: <ul style="list-style-type: none"> • Soils

	<ul style="list-style-type: none"> • Rocks • Minerals • Fossils • Hydrocarbons • Drill core • Stream sediment • Mine samples • Gas or air samples • Water, wastewater, storm water, sewage, sludge • Construction materials • Solid wastes • Raw materials • Final products • Hazardous materials and/or dangerous goods • Atmospheric or airborne contaminants
Site hazards	<p>May include:</p> <ul style="list-style-type: none"> • Solar radiation, dust and noise • Wildlife, such as snakes, spiders, domestic animals • Biohazards, such as micro-organisms and agents associated with soil, air, water • Chemicals, such as acids and hydrocarbons • Sharps, broken glassware • Manual/handling of heavy sample bags and containers • Crushing, entanglement, cuts associated with moving machinery and hand tools • Falling objects, uneven surfaces, heights, slopes, wet surfaces, trenches, confined spaces • Vehicle handling in rough terrain, boat handling in rough or flowing water
Safety procedures	<p>May include:</p> <ul style="list-style-type: none"> • Use of materials safety data sheets (MSDS) • Use of personal protective equipment, such as hard hats, heavy protection, gloves, safety glasses, goggles, • Faceguards, coveralls, gown, body suits, respirators, safety boots • correct labeling of hazardous materials • Handling and storing hazardous material and equipment in accordance with labels, MSDS, manufacturer's instructions, enterprise procedures and regulations

	<ul style="list-style-type: none"> • Regular cleaning and/or decontamination of equipment • Machinery guards • Signage, barriers, service isolation tags, traffic control, flashing lights • Lockout and tag-out procedures
Representative sampling	<p>May include:</p> <ul style="list-style-type: none"> • Size • Frequency • Location
Types of samples	<p>May include:</p> <ul style="list-style-type: none"> • Grab samples • Disturbed or undisturbed materials • Composite samples, such as time, flow proportioned, horizontal/vertical cross section • Quality control samples, such as controls, background, duplicate, blanks
Sampling tools and equipment	<p>May include:</p> <ul style="list-style-type: none"> • Hand tools • Carrying devices • Portable power tools • Front-end loader, backhoe, excavator, drill rig • Shovels, augers, bucket • Sampling frames, sampling tubes, dip tubes, spears, flexible bladders, syringes • Access valves • Sample thief • Weighted sample bottles, bottles, plastic/metal containers and disposable buckets • Sterile containers, pipettes, inoculating loops, disposable spoons • pumps, stainless steel bailers • Mechanical gravity separator • High specific gravity liquids • Hand magnet • Isodynamic magnetic separator • Electrostatic separator • Crusher • Ultrasonic cleaner • Panning and hand jigging

	<ul style="list-style-type: none"> • Hydraulic rock splitter • Diamond saw • Sledge hammer • Crushers • Screens
Common measuring equipment	<p>May include:</p> <ul style="list-style-type: none"> • Dimension apparatus • Dissolved oxygen (DO), electrical conductivity (EC) • Analogue and digital meters, charts/recorders • Basic chemical and biological test kits • Dipsticks and site test kits (for example, HACK) • Timing devices • Temperature measuring devices, such as thermometers, • Thermocouples
Sample preparation	<p>May include:</p> <ul style="list-style-type: none"> • Marking up • splitting • sub-sampling • sealing • size reduction • specific gravity • magnetic suspension • core-cutting • crushing/grinding • sieving • riffing • blending • homogenization • coning • quartering • preparing sub-sample including: stain/polish • petrological and electron microscope/electron microprobes
Typical tests carried out	<p>Visual/optical tests of:</p> <ul style="list-style-type: none"> • appearance, color, texture, identity, turbidity, refractive index (alcohol content, Baume/Brix) • Physical tests, such as- <ul style="list-style-type: none"> ➤ Density, specific gravity, compacted density ➤ Moisture content, water activity

	<ul style="list-style-type: none"> ➤ Particle size, particle shape, size distribution • Chemical tests, such as- <ul style="list-style-type: none"> ➤ Admixtures ➤ Ashes, including sulphated ashes • Packaging tests, such as- <ul style="list-style-type: none"> ➤ Tearing resistance, bursting strength, impact resistance ➤ Permeability and/or leakage • Mechanical tests, such as- <ul style="list-style-type: none"> ➤ Emerson class ➤ concrete slump • Field test <ul style="list-style-type: none"> ➤ Vibration test ➤ Settling test ➤ Cohesion test ➤ Drying test ➤ Padding test ➤ Cement simple field test (color test, palm test etc....) ➤ Bar simple field test (resting test, hammering test etc....) • Laboratory test <ul style="list-style-type: none"> ➤ Moisture Content Determination Test ➤ Gradation (Sieve analysis) Test ➤ Atterberg limit test ➤ Specific Gravity of Soils ➤ Jar test (Silt content test) ➤ Slump test ➤ Proctor test ➤ Abrasion test
Minimizing environmental impacts	<p>May involve:</p> <ul style="list-style-type: none"> • Replacement of soils and vegetation • Driving to minimize soil erosion and damage to fauna and vegetation • Disposal of surplus, spent or purged materials • Recycling of non-hazardous wastes • Appropriate disposal of hazardous waste • Cleaning of vehicles to prevent transfer of pests and contaminants

Evidence Guide			
Critical aspects of	Must demonstrate knowledge, skills and attitude of: <ul style="list-style-type: none"> • interpreting enterprise procedure or standard methods accurately 		
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competence	<ul style="list-style-type: none"> • using safety information (for example, MSDSs) and performs procedures safely • sample collection and handling • checking test equipment before use • completing all tests within required timeline without sacrificing safety, accuracy or quality • calculating, recording and presenting results accurately and legibly • maintaining security, integrity and traceability of all samples, data/results and documentation • cleaning and maintaining equipment
Required Knowledge	<p>Must demonstrate knowledge of:</p> <ul style="list-style-type: none"> • purpose of test • principles of the standard method • pre-use equipment checks • relevant standards/specifications and their interpretation • sources of uncertainty in measurement and methods for control • enterprise and/or legal traceability requirements • interpretation and recording of test result, including simple calculations • procedures for recognition/reporting of unexpected or unusual results • relevant health, safety and environment requirements
Required Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • Apply OHS practice • Apply quality requirements • Apply sampling collection and storage • Apply testing methods and procedures • Use of measuring and collecting and testing tools • Communicate with people that interact within work environment
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Methods of Assessment	<p>Competency may be accessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting</p>

Occupational Standard: Road Construction and Maintenance Level I	
Unit Title	Carry-out Basic Leveling
Unit Code	<u>EIS RCM1 04 0322</u>
Unit Descriptor	This unit covers the knowledge, attitudes and skills required in carrying out of basic leveling in the civil construction industry. It includes planning and preparing, establishing offsets for civil works, setting up and using leveling device, and cleaning up.

Element	Performance Criteria
1. Plan and prepare work	1.1 Access, interpret and apply compliance documentation relevant to the work activity 1.2 Obtain and confirm <i>safety requirements</i> from the site safety plan and organizational policies and procedures, and apply to the allotted task 1.3 Identify, obtain and implement signage requirements from the project traffic management plan 1.4 Select plant, <i>tools and equipment</i> to carry out <i>leveling tasks</i> consistent with the requirements of the job, check for serviceability and rectify or report any faults 1.5 Check <i>leveling equipment</i> for serviceability within specified tolerances, and report any faults 1.6 Identify <i>environmental protection requirements</i> from the project environmental management plan, and confirm and apply to the allotted task
2. Establish offsets for civil works	2.1 Establish offset and recovery pegs from survey controls to specified plans and drawings to meet project requirements 2.2 Re-establish earthwork and pavement control lines from offsets and/or recovery pegs in accordance with plans, drawings and specifications 2.3 Establish drainage offsets from survey control
3. Set up and use leveling device	3.1 Identify <i>heights</i> to be transferred/established from project plans or instructions 3.2 Set up and use leveling instruments correctly in accordance with standard operating procedures and manufacturer's guidelines 3.3 Transfer heights from the known to the required 3.4 Document results of <i>leveling procedure</i> and close them
4. Clean up	4.1 Clear work area and dispose of or recycle materials in accordance

	with project environmental management plan 4.2 Clean, check, maintain and store tools and equipment
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Variable	Range
Safety requirements	<p>may include:</p> <ul style="list-style-type: none"> • OHS requirements in accordance with legislation and regulations, organizational safety policies and procedures, and project safety plan including: protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of firefighting and first aid equipment, hazard control and hazardous materials and substances • safe operating procedures including recognizing and • preventing hazards associated with high voltage power lines, uneven/unstable terrain, trees, overhead service lines, bridges, surrounding buildings, obstructions, structures, facilities, dangerous materials, recently filled trenches, other machines, personnel, traffic control, working at heights, working in proximity to others, worksite visitors and the public • safe parking practices including ensuring access ways are clear, equipment/machinery is away from overhangs and refueling sites, safe distance from excavations, and secured from unauthorized access or movement • recognizing hazards and risks including uneven/unstable terrain, trees, fires, overhead and underground services, • bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials • emergency procedures related to equipment operation including emergency shutdown and stopping, • extinguishing equipment fires, organizational First Aid requirements and evacuation
Tools and equipment	<p>Leveling devices may include:</p> <ul style="list-style-type: none"> • spirit levels, laser levels and automatic levels • survey pegs, leveling staffs, string lines and tape measures • plumb bobs, optical square and inclinometers • batter pegs/boards, wooded/steel pegs and straight edges • hammers and chalk line
Leveling tasks	<p>May include:</p> <ul style="list-style-type: none"> • transferring levels/heights for formwork

	<ul style="list-style-type: none"> • earthwork • roadwork • pipework • drainage works • positioning offsets • recovery pegs
Check leveling equipment	<p>May include:</p> <ul style="list-style-type: none"> • tolerance checks including: • Two peg tests for automatic level • Reverse readings for spirit level
Environmental protection requirements	<p>May include:</p> <ul style="list-style-type: none"> • organizational/project environmental management plan • waste management • water quality protection • noise and vibration • dust and clean-up management
Heights	<p>May be indicated by:</p> <ul style="list-style-type: none"> • drawing/sketch • verbal or written instructions • datum/survey peg • chalk or nail mark • mark on vertical surface
Leveling procedure	<p>May include:</p> <ul style="list-style-type: none"> • open or closed traverse utilizing height of instrument • rise and fall methods of reduction

Evidence Guide			
Critical aspects of competence	<p>Must demonstrate knowledge, skills and attitude on:</p> <ul style="list-style-type: none"> • The requirements, procedures and instructions for carrying out basic leveling • Implementation of requirements, procedures and techniques for the safe, effective and efficient completion of basic leveling • Working with others to undertake and complete the basic leveling in a way that meets all of the required outcomes • Consistent timely completion of basic leveling that safely, effectively and efficiently meets the required outcomes • Conduct of a minimum of three different leveling tasks, at least one utilizing an automatic level; one of the tasks must include closed 		
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	<p>traverse utilizing either the height of instrument or rise and fall method of reduction</p> <ul style="list-style-type: none"> • The conduct of a two-peg test with an automatic level, to confirm instrument meets manufacturer's tolerances • The accurate recording of the results of each leveling procedure to organizational requirements
Required Knowledge	<p>Must demonstrate knowledge on:</p> <ul style="list-style-type: none"> • Basic civil construction processes • Civil construction plan, symbols and construction terminology • Leveling device types, characteristics, technical capabilities and limitations • Leveling techniques related to essential tasks • Basic mathematical techniques associated with leveling • Site and equipment safety requirements • Site isolation and traffic control responsibilities and authorities • Project quality requirements • Civil construction terminology • JSAs/safe work method statement
Required Skills	<p>Must demonstrate skills to:</p> <ul style="list-style-type: none"> • Apply legislative, organization and site requirements and procedures for carrying out basic leveling • Organize work activities • Select and use relevant tools and equipment safely • Identify and report on hazards related to the worksite and work activity • Communicate effectively to receive and clarify work instructions • Apply basic mathematical techniques associated with leveling
Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> • workplace or fully equipped assessment location with necessary tools, equipment and consumable materials
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Observation/Demonstration • Interview/Oral Questions/Written exam
Context of Assessment	<p>Competence may be assessed in the workplace or in simulated workplace environment</p>

Occupational Standard: Road Construction and Maintenance Level I	
Unit Title	Implement Traffic Management Plan with a Stop-Slow Bat
Unit Code	EIS RCM1 05 0322
Unit Descriptor	<p>This unit covers the competency required to implement a traffic management plans in the public road construction sites. It includes: planning and preparing; set out the traffic guidance scheme, monitoring and closing down the traffic guidance scheme; and cleaning up.</p> <p>And also, it covers the knowledge, attitudes and skills required to control traffic on public road construction sites for the protection of site workers and the general public. This unit includes operating a radio and using a stop-slow bat.</p>

Element	Performance Criteria
1. Plan and prepare	<p>1.1 Compliance documentation are accessed, interpreted and applied relevant to implement a traffic management plans</p> <p>1.2 Work instructions, including plans, working drawings, quality requirements and operational details relevant to the tasks are obtained, confirmed and applied to the allotted task</p> <p>1.3 Safety requirements are obtained from the site safety plan and organizational policies and procedures, confirmed and applied to the allotted task</p> <p>1.4 Signage and devices requirements are identified and obtained from the project traffic management plan and implemented</p> <p>1.5 Tools and equipment selected to carry out tasks that are consistent with the requirements of the job, checked for serviceability and any faults are rectified or reported</p> <p>1.6 Environmental protection requirements are identified from the project environmental management plan confirmed and applied to the allotted task.</p> <p>1.7 Traffic controllers are advised of the traffic flow requirements for the site</p>
2. Coordinate traffic	<p>2.1 Temporary traffic signs and barriers are positioned or confirmed in accordance with Regional or Federal regulations</p> <p>2.2 Traffic is directed in accordance with site traffic plan and away from services or areas of potential damage or danger</p> <p>2.3 Vehicles and pedestrian traffic within the work site are controlled to ensure safety of workers through traffic</p>

	<p>2.4 Traffic is monitored, adjustments made for changing conditions, and waiting vehicles positioned to allow for smooth traffic flow</p> <p>2.5 Hand held stop/slow bats are used in accordance with Regional State or Federal regulatory authority approved procedures</p> <p>2.6 Hand signals are used in accordance with Regional State or Federal regulatory authority approved procedures</p> <p>2.7 Traffic offenders are reported in accordance with regulatory authority approved procedures</p>		
3. Set out the traffic guidance scheme	<p>3.1 Traffic guidance scheme is selected to suit site <i>conditions</i>, traffic volumes and work activities</p> <p>3.2 Adherence to work schedule, maximum traffic delays, signals and site <i>communications</i> are determined and ensured</p> <p>3.3 Signs and devices are ensured that they correctly positioned on the approaches to the work area in accordance with the traffic management plan</p> <p>3.4 Signs and devices are ensured that they positioned and displayed on each approach according to Road Authority requirements and the traffic management plan</p> <p>3.5 Signs and devices are ensured that they positioned laterally and displayed in accordance with Road Authority requirements</p> <p>3.6 Traffic is controlled effectively and ensured to protect the work crew placing traffic control devices around the work area</p>		
4. Monitor traffic guidance scheme	<p>4.1 Traffic flow is monitored and effectiveness of guidance scheme determined and ensured</p> <p>4.2 Work activities are monitored and guidance is provided to adjust scheme</p> <p>4.3 Process for dealing with traffic controllers when they fail to adhere to the approved procedures are applied</p> <p>4.4 Procedures to deal with offending motorists are applied</p>		
5. Operate radio	<p>5.1 Radio controls are adjusted for optimum reception/ transmission results</p> <p>5.2 Messages are transmitted concisely and in accordance with operating procedures or best practice</p> <p>5.3 Radio power supply is maintained in accordance with manufacturers recommendation</p> <p>5.4 Radio contact is checked after nominated period of non-contact and in accordance with operating procedures</p>		
6. Close down traffic guidance scheme	<p>6.1 Traffic is ensured controlled to protect work crew removing traffic control devices from the work area</p> <p>6.2 Signs are ensured removed in sequence to provide maximum</p>		
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	<p>warning during removal of traffic control devices</p> <p>6.3 Guidance scheme details are ensured recorded to organisational and or Road Authority requirements</p> <p>6.4 Incidents are ensured reported as required by the organization and/or Road Authority</p>
7. Clean up	<p>7.1 Signs and devices are removed or covered sequentially to provide warning to motorists during shutdown</p> <p>7.2 Work area is ensured cleared in accordance with the project environmental management plan</p> <p>7.3 Tools and equipment are cleaned, checked, maintained and stored in accordance with manufacturers' recommendations and standard work practices</p>

Variable	Range
compliance documentation	<p>May include</p> <ul style="list-style-type: none"> • legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • code of practice • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Work instructions	<p>May include:</p> <ul style="list-style-type: none"> • specifications • quality requirements • operational details • safe work procedures or equivalent • regulatory/legislative requirements • manufacturers' specifications and instructions • organisation work specifications and requirements • instructions issued by authorised organisational or external personnel • relevant Ethiopian standards
Safety requirements	<p>May include but not be limited to:</p> <ul style="list-style-type: none"> • OHS requirements are to be in accordance with legislation and regulations (including general safety/industry induction requirements), organizational safety policies and procedures, and project safety plan

	<ul style="list-style-type: none"> • Personal protective equipment is to include that prescribed under legislation, regulation and workplace policies and practices • Safe operating procedures are to include but not be limited to recognizing and preventing hazards associated with uneven/unstable terrain, trees, pits, poles, trip hazards, dirt mounds, overhead service lines, bridges, surrounding buildings, obstructions, structures, facilities, dangerous materials, recently filled trenches, other machines, personnel, restricted access barriers, traffic control, working in proximity to others, worksite visitors and the public • Safe parking practices are to include but not be limited to ensuring access ways are clear, equipment/machinery is away from overhangs and refueling sites, safe distance from excavations, and secured from unauthorized access or movement • Hazards and risks may include but not be limited to uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials
Signage and devices	<p>May include</p> <ul style="list-style-type: none"> • Temporary warning signs • Regulatory and traffic cones
Tools and equipment	<p>May include but not be limited to:</p> <ul style="list-style-type: none"> • high visibility vests • cones • signage • notebooks • pens • radios • stop-slow bats • delineators • barricades • barriers • bollards • warning lights and beacons • arrow boards • signaling devices
Environmental requirements	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • limited to organizational/project environmental management plan, waste management, water quality protection noise vibration, dust

	and clean-up management
Conditions	<p>may include:</p> <ul style="list-style-type: none"> • varying terrain • all weather conditions • varying road surfaces • all vehicle types • rural, urban or residential localities • all times of day • varying traffic volumes • varying road types • congested urban environments • low traffic rural areas • off-road un-trafficked areas • buildings • parking sites • pedestrian areas • civil construction site • Road where civil construction work is conducted
Communications.	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • instructions and fault reporting and may include two-way radio, hand signals, mobile phone, stop-slow bats, site specific instructions, written instructions or instructions related to job/task
Information	<p>May include but not be limited to:</p> <ul style="list-style-type: none"> • verbal or written and graphical instructions, signage, work schedules/plans/Working drawings, work bulletins, charts and hand drawings, memos, maps, material safety data sheets (MSDS) and diagrams or sketches • Safe work procedures or equivalent related to controlling traffic with a stop-slow bat • Regulatory/legislative requirements pertaining to controlling traffic with a stop-slow bat • Manufacturers' working drawings and instructions • Organization work Working drawings and requirements • Instructions issued by authorized organizational or external personnel • Relevant Ethiopian Standards

Evidence Guide

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<p>Critical aspects of competence</p>	<p>Must demonstrate knowledge, skills and attitude on:</p> <ul style="list-style-type: none"> • Planning and preparation • Set outing the traffic guidance scheme • Monitoring traffic guidance scheme • Close down traffic guidance scheme • Clean up • The requirements, procedures and instructions for implementing of traffic management plans • implementation of requirements, procedures and techniques for the safe, effective and efficient implementing of traffic management plans, which are to include: <ul style="list-style-type: none"> ➤ complying with national and regional regulations on live traffic projects, and ➤ one project controlling site construction vehicles • Working with others to undertake and complete the traffic management plans that meet all of the required outcomes • consistent timely implementation of traffic management plans that safely, effectively and efficiently meets the required outcomes • Location, interpretation and application of relevant information, standards and Working drawings • Compliance with site safety plan, OHS regulations and Federal/Regional legislation applicable to workplace operations • Compliance with organizational policies and procedures including quality requirements • As a minimum, control traffic complying with Federal/Regional regulations on three separate live traffic projects and one project controlling site construction vehicles • Safe and effective operational use of equipment • Communication and working effectively and safely with others
<p>Required Knowledge</p>	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Site and equipment safety requirements • Traffic controlling • Traffic management plans • Traffic control signage and barricades • Radio operations • Equipment types, characteristics, technical capabilities and limitations • Operational and maintenance procedures for equipment

	<ul style="list-style-type: none"> • Site isolation and traffic control responsibilities and authorities • Effects of travel speed and vehicle mass on stopping distances • Civil Construction terminology
Required Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • apply OHS practice • control traffic • operate Radio • apply quality requirements • apply traffic signs • interpret traffic management plans • use tools • communicate with other employees and people that interact within work environment
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competency may be accessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard: Road construction and maintenance Level L1	
Unit Title	Drain and De-water Civil Construction Site
Unit Code	<u>EIS RCM1 06 0322</u>
Unit Descriptor	This unit covers draining and/or dewatering of civil construction project sites. It includes: planning and preparing; positioning sedimentation control; remove surface water; constructing sump and wells; removing water from sumps or wells, trenches and pits; and cleaning up.

Element	Performance Criteria
1. Plan and prepare	<p>1.1 Compliance documentation relevant to draining and/or dewatering project sites are accessed,</p> <p>1.2 Relevant Work instructions are obtained, confirmed and applied to the tasks to the allotted task</p> <p>1.3 Safety requirements from the site safety plan and organizational policies and procedures are obtained, confirmed and applied to the allotted task</p> <p>1.4 Signage requirements from the project traffic management plan are identified, obtained and implemented</p> <p>1.5 Plant, tools and equipment to carry out tasks that are consistent with the requirements of the job are selected, checked them for serviceability and rectified or any faults are reported</p> <p>1.6 Environmental protection requirements from the project environmental management plan are identified, confirmed and applied to the allotted task</p>
2. Position sedimentation control	<p>2.1 Sedimentation controls are positioned according to project environmental management plan</p> <p>2.2 Sedimentation control barriers are constructed in accordance with the environmental management plan</p> <p>2.3 Geo-fabrics and/or woven wire is positioned according to specification and to the environmental management plan</p>
3. Remove surface water	<p>3.1 Temporary drainage systems are established to drain or divert surface and sub-surface water to the storm water drainage system</p> <p>3.2 Slab and site surface water is removed and/or directed to the temporary drainage system</p> <p>3.3 Surface holes and depressions are filled</p>

	3.4 Surface water is <i>drained to drainage</i> system using adequate fall
4. Construct sump/wells	4.1 Sump and/or well is located at the lowest point to be drained to maximize pump efficiency 4.2 Sumps and/or wells are constructed to work instructions
5. Remove water from sumps/wells, trenches and pits	5.1 Surface or submersible pumps are installed 5.2 Surface pump is located as close as practicable to the sump or well 5.3 Water is pumped to temporary drainage system according to the project environmental management plan 5.4 Discharged water is dispersed using approved procedures
6. Clean up	6.1 Work area is cleared and <i>materials</i> are disposed of or recycled in accordance with project environmental management plan 6.2 Plant, <i>tools and equipment</i> are cleaned, checked, maintained and stored in accordance with manufacturer's recommendations and standard work practices

Variable	Range
Compliance documentation	may include: <ul style="list-style-type: none"> legislative, organization and site requirements and procedures manufacturer's guidelines and specifications Ethiopian standards code of practice Employment and workplace relations legislation Equal Employment Opportunity and Disability Discrimination legislation
Drained and/or dewatered	Areas to be drained and/or dewatered are to include: <ul style="list-style-type: none"> control of surface water, bores, coffer dam, springs, creeks, wetland water, seepage water in trenches and pits and low-lying natural ground where water may not escape
Drainage	is to include: <ul style="list-style-type: none"> graded surface level gutters and ditches excavated manually or by machine and various types of plastic piping
Dewatering	techniques are to include: <ul style="list-style-type: none"> sumps, wells, submersible pumps, vacuum pumps, surface pumps and sludge pumps
Project sites	include: <ul style="list-style-type: none"> road construction sites, excavation projects and construction sites in close proximity of wetlands or active water
Work instructions	may include: <ul style="list-style-type: none"> plans, specifications, quality requirements and operational details quality

	requirements may include: dimensions, tolerances, standards of work and material standards as detailed in the project drawings, specifications and project documentation to meet client satisfaction
Safety requirements	<p>may be from the site safety plan and organizational policies and procedures and may include: -</p> <ul style="list-style-type: none"> • protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of firefighting equipment, use of first aid equipment, hazard control and hazardous materials and substances • safe operating procedures, which are to include: recognizing and preventing hazards associated with underground services, other machines, personnel, traffic control, working in proximity to others, worksite visitors and the public • hazards and risks, which may include: uneven/ unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials • emergency procedures, which are to include: emergency shutdown and stopping, extinguishing equipment fires, organizational first aid requirements and evacuation
Traffic signage and devices	<p>May include:</p> <ul style="list-style-type: none"> • temporary warning signs, regulatory and traffic cones
Traffic signage and devices	<p>May include:</p> <ul style="list-style-type: none"> • highway traffic signs, site safety signage, guide signs, warning signs, barriers, hazard markers, portable traffic signals, bollards, arrow boards, vehicle mounted signs, flashing lights, barricades, and traffic conditions signage
Environmental Requirements	<p>May include: -</p> <ul style="list-style-type: none"> • organizational/project environmental management plan, waste management, water quality protection, noise, vibration, dust and clean-up management
Materials	<p>May include:</p> <ul style="list-style-type: none"> • various types of plastic piping, silt fences, rocks or straw bales
Tools and equipment	<p>May include:</p> <ul style="list-style-type: none"> • hoses, shovels and pumps

Evidence Guide	
Critical aspects of competence	<p>Demonstrates knowledge, skills and attitude on:</p> <ul style="list-style-type: none"> • Planning and preparation • Position sedimentation control

	<ul style="list-style-type: none"> • Removal of surface water • Constructing sump/wells • Removing water from sumps/wells, trenches and pits • Clean up • The requirements, procedures and instructions for draining and dewatering of civil construction site • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of the draining and dewatering of civil construction site, which is to include: <ul style="list-style-type: none"> ➤ draining surface water from a site using surface drains ➤ demonstrate dewater a trench or pit ➤ Demonstrate establishing sedimentation controls • working with others to undertake and complete the draining and dewatering of civil construction sites that meets all of the required outcomes • consistent timely completion of the draining and dewatering of civil construction sites that safely, effectively and efficiently meets the required outcomes
Required Knowledge	<p>Must demonstrate knowledge of:</p> <ul style="list-style-type: none"> • site and equipment safety requirements • drainage and dewatering • sedimentation controls • grading and levelling • free water • pumps • environmental considerations • construction principles • processes for interpreting engineering drawings • equipment types, characteristics, technical capabilities and limitations • operational, maintenance and basic diagnostic procedures • site isolation and traffic control responsibilities and authorities • materials safety data sheets and materials handling methods • project quality requirements • civil construction terminology • Safe work method statement
Required Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • apply legislative, organisation and site requirements and procedures • apply operational, maintenance and basic diagnostic procedures • apply pump operating requirements and procedures

Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard: Basic Infrastructure Operations Level I	
Unit Title	Conduct Labor based Earthwork
Unit Code	EIS RCM1 07 0322
Unit Descriptor	This unit covers the knowledge, attitudes and skills required in the conduct of earthworks in the civil construction industry. It includes planning and preparing work, setting out sub-grades, forming earthworks, placing and compacting sub-grading replacement materials, and cleaning up.

Element	Performance Criteria
1. Plan and prepare work	<p>1.1. Types and sources of Information are obtained, confirmed and applied to form the earthwork of the labor-based road project task</p> <p>1.2. <i>Occupational Health and Safety requirements</i> are obtained from the site safety plan and organizational policies and procedures, confirmed and applied to the allotted task</p> <p>1.3. Signage requirements are identified and obtained from the project traffic management plan and implemented</p> <p>1.4. <i>Plant, tools and equipment</i> which are selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults are rectified or reported</p> <p>1.5. Compaction standards and testing requirements are correctly identified for job from specification / briefs</p> <p>1.6. Environmental protection requirements are identified from the project environmental management plan, confirmed and applied to the allotted task</p>
2. Carry out clearing and grubbing operation	<p>2.1 Clearing road width and length is set out as per the work order</p> <p>2.2 Labor forces are informed of job requirements</p> <p>2.3 Bush clearing, stump, top soil and boulders are removed as per the work order using labor-based road construction technologies</p> <p>2.4 Cleared and removed materials are disposed in accordance to the work order.</p>
3. Perform excavation and fill operation	<p>3.1 Cross sections, vertical and horizontal alignments are set out as per the work order using labor base technologies.</p>

	<p>3.2 Labor forces are informed of job requirements.</p> <p>3.3 Given earth work quantities and team days are accomplished and known with suitable working space.</p> <p>3.4 Level to level cut /fill are done in accordance to the working drawing or the work order using labor-based road construction method.</p> <p>3.5 Moisture content, sequence and layer compaction are done according to the work order</p> <p>3.6 Cleared and waste materials are disposed of as per the work order.</p>
4. Conduct ditches and road formation operation	<p>4.1 The given ditch location, shape and shoulder control points are set out and checked using labor base technologies</p> <p>4.2 Labor forces are informed of job requirements.</p> <p>4.3 Ditches, road formation, camber, super elevation and side slope formation are set out and performed according to the working drawing.</p> <p>4.4 The earthworks operation process is assessed and controlled to ensure that the specified height and the overall dimensions are achieved.</p> <p>4.5 Cleared and waste materials are disposed in the given space.</p>
5. Clean up	<p>5.1 Clear work area and dispose of or recycle materials in accordance with project environmental management plan</p> <p>5.2 Clean, check, maintain and store plant, tools and equipment</p>

Variable	Range
Safety requirement	<ul style="list-style-type: none"> • OHS requirements in accordance with legislation and regulations, organizational safety policies and procedures, and project safety plan, including protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of firefighting equipment, use of first aid equipment, hazard control and hazardous materials and substances • Safe operating procedures including recognizing and preventing hazards associated with high voltage power lines, uneven/ unstable terrain, trees, overhead service lines, bridges, surrounding buildings, obstructions, structures, facilities, dangerous materials, recently filled trenches, other machines, personnel, traffic control, working at heights, working in proximity to others, worksite

	<p>visitors and the public</p> <ul style="list-style-type: none"> • safe parking practices including ensuring access ways are clear, equipment/machinery is away from overhangs and refueling sites, safe distances are kept from excavations, and areas secured from unauthorized access or movement • recognizing hazards and risks including uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials • emergency procedures related to equipment operation including emergency shutdown and stopping, extinguishing equipment fires, organizational first aid requirements and evacuation
Tools and equipment	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Toller, tractor with trailer, tractor towed water tanker, profile board, string, sprit level, ranging rods, meter, ditch templates, straight edge 2mts or longer, comber board, picks, shovel, wheelbarrows, hoes, rakes, crowbars, mattocks, sledge hammers + hammers, pick axes, ropes, plate compactor etc.
Work instructions	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Job order from site supervisor or engineer.
Materials	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Pegs, borrow and/or in-situ materials for the road formation and fill use, water
Ditches	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • Side ditch including miter drains, secondary drain.
Earthworks	<ul style="list-style-type: none"> • Cutting and filling with existing material • The forming of existing material • The replacement of unsuitable materials • The stabilizing of unsuitable materials • The use of geo-synthetic material

Evidence Guide	
Critical aspects of competence	<p>Must demonstrate knowledge, skills and attitude of:</p> <ul style="list-style-type: none"> • the requirements, procedures and instructions for conducting earthworks • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of earthworks • working with others to undertake and complete the conduct of

	<p>earthworks that meets all of the required outcomes</p> <ul style="list-style-type: none"> • consistent timely completion of earthworks that safely, effectively and efficiently meets the required outcomes • The candidate should demonstrate, in accordance with the standard of the organizational procedures, the ability to perform manual earthwork, support the team in the implementation of following tasks: <ul style="list-style-type: none"> ➤ plan and prepare work ➤ carry out clearing and grubbing operation work based on the given tasks ➤ perform excavation and fill level to level work based on the given tasks ➤ conducting, follow up and control ditches and road formation work based on the given tasks ➤ conduct ditches and road formation operation based on the given tasks 		
Required Knowledge	<p>Must demonstrate knowledge of:</p> <ul style="list-style-type: none"> • type, uses and limitations of plant used for earthworks construction • earthworks construction and sub grade preparation techniques • work recording techniques including specifications, check-lists and drawings • setting out procedures • processes for the calculation of material requirements • compaction and stabilization techniques/methods • plan reading and interpretation • site and equipment safety requirements • site isolation and traffic control responsibilities and authorities • responsibilities under the environmental management plan • materials handling methods • project quality requirements • civil construction terminology • methods and techniques of carrying out clearing and grubbing operation • methods and techniques of performing excavation and fill level to level based on the given tasks • methods and techniques of setting out a section of earthworks with a full cut, fill • methods and techniques of placement and compaction of sub-grade replacement 		
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	<ul style="list-style-type: none"> • methods and techniques of producing finished works meeting required dimensions • Safe and effective operational use of tools, small plant and equipment
Required Skills	<p>Must demonstrates skills to:</p> <ul style="list-style-type: none"> • Apply legislative, organization and site requirements and procedures for conducting earthworks • Organize work activities • Select and use relevant tools and equipment safely • Completion of the earthwork's construction is to include as a minimum: <ul style="list-style-type: none"> • Shaping the in-situ material and/or placement of material and compaction to form the road sub-grade. • Materials with the finished works meeting required dimensions, heights as per the work order • Following up and controlling excavation and fill level to level based on the given tasks • Skill of deciding the magnitude of the grade, level of cut and fill to be made for constructing the road as well as setting out on the ground the construction stakes that shows offset stakes, the cut and fill heights that guide the operation of the road formation work • Setting out guiding construction slots as appropriate • Setting out and construction process control of the formation of finished grade, slopes and cumber slope formations • Identify and report on hazards related to the worksite and work activity • Communicate effectively to receive and clarify work instructions
Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> • Workplace or fully equipped assessment location with necessary tools, equipment and consumable materials
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Observation/Demonstration • Interview/Oral Questions/Written exam
Context of Assessment	<p>Competence may be assessed in the workplace or in simulated workplace environment</p>

Occupational Standard: Road construction and maintenance Level I	
Unit Title	Conduct Labor Based Gravel Pavement Works
Unit Code	EIS RCM1 08 0322
Unit Descriptor	This unit covers the knowledge, attitudes and skills required to conduct the construction of a gravel pavement using labor-based road construction technology. It includes the minimum criteria for competence assessment. The competence includes the set-out, the direction for the placement and spreading, trimming of granular pavement, material compaction and cleanup of waste materials

Elements	Performance Criteria
1. Prepare and perform pre-condition activities	<p>1.1.Types & Sources of Information are obtained, confirmed and applied to the allotted task.</p> <p>1.2.Occupational Health & Safety requirements are obtained and implemented as per organizational policies and procedures.</p> <p>1.3.Identified signage requirements are obtained and implemented.</p> <p>1.4.Selected Plant, tools and equipment to carry out tasks are checked for serviceability and any faults are rectified or reported.</p> <p>1.5.Material appropriate to the work application are identified, safely handled and located ready for use.</p> <p>1.6.Civil construction employment conditions, responsibilities and obligations are communicated.</p> <p>1.7.Environmental protection requirements are identified from the project environmental management plan or appropriate regulatory specifications</p>
2. Conduct selects material production	<p>2.1 Quarry site is selected; quality of material is insured according to the work order.</p> <p>2.2 Selected material is produced using the practice and procedure of labor-based road construction material production techniques by using tools and equipment.</p>
3. Conduct, surfacing /paving work/	<p>3.1 Road width, thickness and damping space are set and lied out according to the work order.</p> <p>3.2 Surfacing material is transported using the appropriate hauling means.</p> <p>3.3 Surfacing material is spread and compacted according to the work order /using labor-based surfacing techniques by using tools and equipment.</p>

Variable	Range
Quality of material	Quality material conformity with the design specification is checked and confirmed using appropriate testing by the material experts/technicians
Work order	May include but not limited to: <ul style="list-style-type: none"> • Job instructions given by the site supervisor or engineer as per the drawings and specifications
Hauling means	May include but not limited to: <ul style="list-style-type: none"> • wheel barrow • animal cart • tractor - trailer • dump truck
Materials	May include but not limited to: <ul style="list-style-type: none"> • select material • cinder/ashes • Water
Tools and equipment	May include but not limited to: <ul style="list-style-type: none"> • tractor- trailer • wheel barrow • tractor towed water trailer with water browser • portable roller • Sledge Hammer • Camber Board + Spirit Level • Profile board • Hoes • Shovels • Strings • Ranging rods, • wheelbarrows, • crowbars

Evidence Guide	
Critical aspects of competence	Demonstrates knowledge, skill and attitude on: <ul style="list-style-type: none"> • compliance with site safety plan, OH&S regulations applicable to workplace operations • Surfacing material production. • Completion of the construction of a road pavement including set

	<p>out of sub base</p> <ul style="list-style-type: none"> • Placement and spreading of materials • the implementation unit/team of the following tasks: <ul style="list-style-type: none"> ➤ Prepare and perform pre-condition activities ➤ Conduct selects material production ➤ Conduct, surfacing /paving work/
Required Knowledge	<p>Must demonstrate knowledge of:</p> <ul style="list-style-type: none"> • Surfacing material production. • Compliance with site safety plan, OH&S regulation applicable to workplace operations. • Completion of the construction of a road pavement including setting out of sub base and surface levels • Placement, spreading of materials and compaction procedures and standards
Required Skills	<p>Must demonstrate skills to:</p> <ul style="list-style-type: none"> • Apply surfacing material production • Get completion of the construction of a road pavement including setting out of sub base and surface levels • Apply placement, spreading of materials and compaction procedures and standards
Resources Implication	<p>Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.</p>
Assessment Methods	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	<p>Competency may be assessed in the work place or in a simulated work place setting.</p>

Occupational Standard: Road construction and maintenance Level I	
Unit Title	Carry out Chiseling, Lay Cobblestone & Block Pavement Work
Unit Code	EIS RCM1 09 0322
Unit Descriptor	This unit covers the knowledge, attitudes and skills required in the selection of raw materials, preparing chiseling tools, selecting chiseling place and observing safety precaution and it covers the laying of pavers in the civil construction industry. It includes planning and preparing for work, preparing to lay paving, laying pavers, and cleaning up.

Element	Performance Criteria
1 Plan and prepare for work	<p>1.1 Compliance documentation relevant to the work activity are accessed, interpreted and applied</p> <p>1.2 Safety requirements are obtained and confirmed from the site safety plan and organizational policies and procedures, and applied to the allotted task.</p> <p>1.3 Tools and equipment to carry out tasks are selected consistent with the requirements of the job, checked for serviceability and rectified or reported any faults</p> <p>1.4 Environmental protection requirements are identified from the project environmental management plan, and confirmed and applied to the allotted task</p> <p>1.5 Area and location of paving are identified from job drawings</p> <p>1.6 Paving requirements and selected material are calculated to meet required finish of surface and pattern</p>
2 Identify the raw material	<p>2.1 Types of raw material are identify based on the desired need of client</p> <p>2.2 Identified raw material is made ready for the work according to the size of the cobble stone to be produced</p>
3 Prepare chiseling tools and materials	<p>3.1 Tools are selected and prepared in accordance with the job specifications</p> <p>3.2 Chiseling materials are selected based on the type of stone to be chiseled</p> <p>3.3 Chiseling material are checked for their proper functioning</p>
4. Select proper place for chiseling	<p>4.1. Sheltered place form the sun and rain is selected based on safe work place procedures</p> <p>4.2. Flat and well-ventilated chiseling place is selected based on</p>

	safe work place procedures
5. Carry-out chisel works	<p>5.1 Primary and secondary chiseling tools are used appropriate to their chiseling capacity.</p> <p>5.2 Raw material is measured out and chiseled according to job requirement and specifications</p> <p>5.3 Appropriate personal protective equipment is wore following safe work procedures</p> <p>5.4 Safety cloths are identified based on the proposed work procedure</p> <p>5.5 Safety cloths are wore based on the requirement of the work</p>
6. Complete work process	<p>6.1 Work area is cleaned after chiseling works</p> <p>6.2 Tools and materials are cleaned and kept/stored in accordance with standard procedures</p> <p>6.3 OHS is observed throughout the work process</p>
7. Prepare to lay paving materials	<p>7.1 Location and shape of paving area are set out to dimensions from job drawings</p> <p>7.2 Excavation to specified depth, allowing for base and thickness of unit are carried out</p> <p>7.3 Drainage pipes are positioned in sub-soil to local regulations</p> <p>7.4 Sub-soil and footing are prepared in accordance with specifications</p> <p>7.5 Base material is selected in accordance with manufacturer's specifications for identified substrate</p> <p>7.6 Surface is cleaned free of loose material and dust where paving is to be bonded to substrate</p>
8. Lay pavers	<p>8.1 Edge boards are positioned to set out and specifications</p> <p>8.2 Sand and aggregate are spread and compacted to specifications</p> <p>8.3 Paving surface is graded, where drainage is necessary, to fall evenly without ponding to outlets or surface run off system provided</p> <p>8.4 Mortar is mixed for masonry paving to specifications</p> <p>8.5 <i>Pavers</i> are cut to form edges ensuring fit and minimum wastage of material</p> <p>8.6 Paving units are laid to designed pattern</p> <p>8.7 Edges are completed to specification</p> <p>8.8 Compaction, mortaring and sweeping work are completed to specifications</p> <p>8.9 Finish level is maintained across junctions between different levels</p>

9. Clean up	<p>9.1 Tools and materials are cleaned and kept/stored in accordance with standard procedures</p> <p>9.2 OHS is observed throughout the work process</p> <p>9.3 Work area materials are cleaned, cleared and disposed of or recycled in accordance with project environmental management plan</p> <p>9.4 Tools and equipment are cleaned, checked, maintained and stored</p>
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Variable	Range
Relevant compliance documentation	<p>May include:</p> <ul style="list-style-type: none"> • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Tools and Equipment	<p>May include:</p> <ul style="list-style-type: none"> • Chiseling hammer different size • Chisels: <ul style="list-style-type: none"> • sharp edge chisels to splitting the stone • flat edge chisels (different) for chiselling the surface of the stone • First aid kit • Cleaning materials (brush, broom, water, soap, shovel) • hand tools • spreader bars • spirit/string levels • laser levels • trowels • rubber mallets • hammers • balustrades • brick saws • grinders • plate compactors • concrete mixers
Types of raw material	<p>Different types of stones like</p> <ul style="list-style-type: none"> • Trachyte, Granite or Basalt

	<p>Pavers may include:</p> <ul style="list-style-type: none"> • blocks • cobble stone • ceramic • concrete • quarry and may be laid on: • footpaths • roads • cycle paths • malls • podiums • sports arenas • platforms • recreational areas
Size to produce	<ul style="list-style-type: none"> • 10 x 10, 15 x 17, curb stone
Chisel works	<ul style="list-style-type: none"> • Chiseled 10x10 cm. cobble stone for road and walk way construction • Chiseled 15x17 cm. cobble stone for road, round tree, seat and green area construction • Chiseled curb stone 40-100 x 20-25 x 10-15 as required (may be 40cm. length x20 height x10 cm. width) to support edge of the pavement
Occupational Health and Safety (OHS)	<p>OHS requirements may include:</p> <ul style="list-style-type: none"> • Workplace environment and safety • Protective clothing and equipment • Use of tools and equipment • Handling of materials • Control of dust • Control of noise • Personal protective equipment may include: <ul style="list-style-type: none"> ➤ boots, gloves, hard hat / cap ➤ safety glasses/goggles ➤ ear plugs/muffs ➤ dust masks/respirators • goggles

Evidence Guide

Critical aspects of competence	<p>Must demonstrate knowledge, skills and attitude on:</p> <ul style="list-style-type: none"> • identified raw materials • prepared chiselling tools • selected work area • carried-out chiselling works • the implementation unit/team of the following tasks: <ul style="list-style-type: none"> ➢ Plan and prepare for work ➢ Prepare to lay paving ➢ Lay pavers ➢ Clean up • the requirements, procedures and instructions for laying pavers • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of paver laying • working with others to undertake and complete the laying of pavers that meets all of the required outcomes • consistent timely completion of paver laying that safely, effectively and efficiently meets the required outcomes • Demonstrate laying of pavers (preparation, laying and finishing) work
Required Knowledge	<p>Must demonstrate knowledge of:</p> <ul style="list-style-type: none"> • materials needed to obtain maximum efficiency in chiseling • chiseling into desired places • chiseling using appropriate tools • storing the chiseled materials • simple calculations and measurements • basic principles of soil technology for civil works • types, characteristics, uses and limitations of pavers • techniques for preparing foundations and beddings for pavers • foundation formwork techniques • techniques for cutting and forming pavers • techniques and patterns for laying pavers • paver compaction techniques, equipment and tools • finishing and edging techniques and processes • site and equipment safety requirements • processes for interpreting engineering drawings and sketches • site isolation and traffic control responsibilities and authorities • materials safety data sheets and materials handling methods • project quality requirements

	<ul style="list-style-type: none"> • civil construction terminology • Safe work method statement
Required Skills	<p>Demonstrates skills to:</p> <ul style="list-style-type: none"> • identify raw materials • prepare chiseling tools • select work area • carry-out chiseling works • apply legislative, organisation and site requirements and procedures for laying pavers • organise work activities • select and use relevant tools and equipment safely • identify and report on hazards related to the worksite and work activity • communicate effectively to receive and clarify work instructions
Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> • Different raw materials • Access is required to real or appropriately simulated situations, including work areas, materials and equipment • Provide necessary personal protective equipment
Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> • Workplace or fully equipped assessment location with necessary tools, equipment and consumable materials
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Observation/Demonstration • Interview/Oral Questions/Written exam
Context of Assessment	<p>Competence may be assessed in the workplace or in simulated workplace environment</p>

Occupational Standard: Road construction and maintenance Level I	
Unit Title	Conduct Basic Scaffolding Operations/Formworks/Falseworks
Unit Code	EIS RCM1 10 0322
Unit Descriptor	This unit covers the knowledge, attitudes and skills required in the conduct of basic scaffolding operations and construction of formwork and falsework in the civil construction industry. It includes planning and preparing for scaffolding operations, erecting maintaining scaffolding and dismantling scaffolding, and erecting, inspecting and stripping formwork.

Element	Performance Criteria
1. Plan and prepare for scaffolding operations	1.1 Access, interpret and apply compliance documentation relevant to the work activity 1.2 Access and interpret <i>work requirements</i> 1.3 Develop the <i>preliminary scaffolding plan</i> in accordance with <i>safety</i> requirements 1.4 Confirm <i>site preparation</i> with other appropriate personnel and implement hazard control measures if necessary 1.5 Identify and select <i>equipment</i> consistent with work requirements 1.6 Check equipment is ready for use and report, label and repair any defects 1.7 Confirm scaffolding plan in accordance with <i>regulatory authorities</i> and <i>environmental requirements</i>
2. Erect and maintain scaffolding	2.1 Erect scaffolding in accordance with <i>safe work practices</i> 2.2 Adhere to safety requirements at heights, on incomplete Structures and in confined spaces 2.3 Install static lines when specified 2.4 Assemble and erect lifting device where specified 2.5 Inspect <i>critical structural</i> and <i>safety areas</i> and <i>equipment</i> periodically while in use to identify any variation from the plan and record inspection in inspection log 2.6 Perform alteration or repair to critical structural and safety areas and equipment
3. Dismantle scaffolding	3.1 Isolate scaffolding and appropriately sign and barricade to enable safe dismantling 3.2 Inspect, classify, label and dismantle scaffolding safely using the reverse procedure for erection

	<p>3.3 Clear work area and dispose of used and recycled materials in accordance with job specification, relevant regulatory authorities and environmental requirements</p> <p>3.4 Clean and check equipment and store in accordance with manufacturer's recommendations and standard work practices</p>
4. Prepare for formwork erection	<p>4.1 Identify location and design of formwork/falsework from site drawings, engineers' design and specifications</p> <p>4.2 Accurately place <i>key set out locations</i> to requirements of job drawings</p> <p>4.3 Prepare work area and materials for the erection of formwork/falsework</p> <p>4.4 Assemble formwork shutters to design form requirements and specified dimensions</p> <p>4.5 Sequentially erect formwork support system (falsework) according to initial set out and standards</p> <p>4.6 Check scaffolding and/or hand railing where required in accordance with job specification and standards</p> <p>4.7 Place bracing of formwork support to job requirements and design specifications to maintain rigidity and stability</p> <p>4.8 Set support system to correct height level, line and tolerance</p>
5. Erect formwork	<p>5.1 Fabricate, position and fix formwork for beams, drop panels and cantilevers into place</p> <p>5.2 Assemble, erect and fix formwork for walls into place, plumb and to specified tolerance</p> <p>5.3 Fabricate, position and fix soffit formwork into place</p> <p>5.4 Fix edge boxing to formwork in correct position and plumb to alignment.</p> <p>5.5 Brace formwork</p> <p>5.6 Install cast-ins, inserts and penetration blocks to locations</p>
6. Inspect formwork	<p>6.1 Inspect erected formwork and formwork support system for safety and quality of work in accordance with standards</p> <p>6.2 Remove loose dirt, sawdust and other waste material with due care to welfare of site personnel and public</p> <p>6.3 Apply release agent to formwork in accordance with specifications</p> <p>6.4 Monitor formwork and support system during concrete pour</p>

7. Strip formwork	<p>7.1 Obtain approval to remove formwork support from appropriate site authority</p> <p>7.2 Carefully remove edge boxing and braces, denail, clean and store/stack</p> <p>7.3 Back off support system to appropriate height to loosen soffit decking</p> <p>7.4 Safely and sequentially remove formwork, denail and relocate or store</p> <p>7.5 Select and install appropriate back propping system, where applicable, according to standards and engineers' requirements</p>
8. Clean up	<p>8.1 Clear work area and dispose of or recycle <i>materials</i> in accordance with project environmental management plan</p> <p>8.2 Clean, check, maintain and store plant, tools and equipment</p>

Variable	Range
Work requirements	<p>May include:</p> <ul style="list-style-type: none"> • plans and specifications • quality scaffolding requirements • quantity scaffolding requirements • operational details • shift briefings • handover details • work orders • purpose of scaffolding
Preliminary scaffolding plan	<p>May include:</p> <ul style="list-style-type: none"> • site sketch • scaffolding requirements • scaffolding / equipment configurations • identification of potential hazards • control measures • site access and exit • estimation of types and quantities of components • identification of scaffolding coordination requirements • transportation of required equipment
Safety	<p>May include:</p> <ul style="list-style-type: none"> • relevant OHS requirements in accordance with the following: <ul style="list-style-type: none"> ➤ applicable legislation

	<ul style="list-style-type: none"> ➤ applicable regulations ➤ applicable code of practice ➤ applicable organizational safety policies and procedures ➤ project safety plan ➤ protective clothing and equipment ➤ use of tools and equipment ➤ workplace environment ➤ handling of materials ➤ use of firefighting equipment and first aid ➤ hazard control including hazardous materials and substances ➤ safe operating workplace procedures <ul style="list-style-type: none"> • conduct an operational risk assessment and treatments associated with power cables including: overhead service trays, cables and conduits, lighting • earth leakage boxes • trip hazards • 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 • the public emergency procedures including: extinguishing fires, organizational first aid requirements evacuation • management plans • manufacturer's instructions • reporting defects in equipment
Site preparation	<p>May include:</p> <ul style="list-style-type: none"> • site isolation • worksite inspection • assessment of conditions • hazard identification • erection of barriers • installation of signage • assembly and erection of lifting devices • establishment of footings

	<ul style="list-style-type: none"> • equipment defect identification
Equipment	<p>May include:</p> <ul style="list-style-type: none"> • plan • tools • free standing prefabricated scaffolds • cantilevered hoists with a working load limit not exceeding 500kg (materials only) • ropes • gin wheels • safety nets and static lines • bracket scaffolds (tank and formwork) • aluminum modular scaffolding equipment • ladders and scaffolding planks • steel box spanners • hammers • spirit levels • tape measures • shovels • spanners • whipping cord • fiber rope • scaffolding materials
Statutory / regulatory authorities	<p>May include:</p> <ul style="list-style-type: none"> • relevant federal, state and local authorities administering the applicable acts • regulations and relevant code of practice • applicable Ethiopian standards • manufacturer's requirements
Environmental requirements	<p>May include:</p> <ul style="list-style-type: none"> • waste management • noise and dust • clean-up management • environmental plans and protection • regulatory obligations
Safe work practices	<p>May include:</p> <ul style="list-style-type: none"> • planned hazard prevention and control measures • whipping designated rope ends in accordance with regulations and project specifications

	<ul style="list-style-type: none"> • splicing designated rope ends in accordance with regulations and project specifications • applying bends and hitches and inspecting them in accordance with project specifications • maintenance of an inspection log for the inspection and repair of scaffolding
Critical structural and safety areas	<p>May include:</p> <ul style="list-style-type: none"> • damage • corrosion and wear • stability and scaffold stability • current usage reconciled with changes to the plan via the inspection log
Plant, tools and equipment (for formworks)	<p>May include:</p> <ul style="list-style-type: none"> • spanners, saws, power saws • nail guns and drills • string lines and spirit levels • leveling equipment • chisels, hammers, • compressors and hoses • tape measures and rulers • marking equipment • crow bars and pinch bars • scaffolding and ladders
Formwork	<p>Erected to provide a moulded shape, structure and finish to:</p> <ul style="list-style-type: none"> • cast-in situ concrete decks • piers/headstocks • footings/pile caps/abutments • cast-in situ girders
Falsework	<ul style="list-style-type: none"> • A temporary support structure designed to carry the various loads imposed on the formwork during construction of bridge components
Key set out locations	<p>May include:</p> <ul style="list-style-type: none"> • points • lines • profiles • grids
Bracing	<p>May include:</p> <ul style="list-style-type: none"> • adjustable props

	<ul style="list-style-type: none"> • timber
Soffit	<p>May include:</p> <ul style="list-style-type: none"> • flooring • decking • base work making up the underside of formwork
Cast-ins, inserts and penetration blocks	<p>May include:</p> <ul style="list-style-type: none"> • services • anchor bolts • other fixtures
Materials	<p>May include:</p> <ul style="list-style-type: none"> • screws and nails • plywood and structural timber • proprietary shutters and walers • soldiers and soldier sets • release agent • adjustable props • brackets and base plates • she bolts and clips

Evidence Guide			
Critical aspects of competence	<p>Must demonstrate knowledge, skills and attitude of:</p> <ul style="list-style-type: none"> • the requirements, procedures and instructions for the conduct of basic scaffolding operations/formworks/falseworks • implementation of requirements, procedures and techniques for the safe, effective and efficient conduct of basic scaffolding operations/formworks/falseworks • working with others to undertake and complete the conduct of basic scaffolding operations/formworks/falseworks that meets all of the required outcomes • consistent timely completion of basic scaffolding operations/formworks/falseworks that safely, effectively and efficiently meets the required outcomes 		
Required Knowledge	<p>Must demonstrate knowledge on:</p> <ul style="list-style-type: none"> • workplace and scaffolding equipment safety requirements • quality scaffolding requirements • plant, tools and equipment types, characteristics, uses, limitations and relevance to scaffolding • materials safety data sheet 		
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	<ul style="list-style-type: none"> • scaffolding plans, drawings and specifications • scaffolding materials handling, storage and environmentally friendly waste management • JSAS/safe work method statements • relevant legislation, regulations and code of practice relating to the erection, alteration and dismantling of scaffolding/ formworks/ falseworks • scaffolding/ formworks/falseworks lifting devices • scaffolding/ formworks/falseworks site and equipment safety requirements • scaffolding/ formworks/falseworks equipment characteristics, technical capabilities and limitations • scaffolding operational/formworks/falseworks and maintenance procedures
Required Skills	<p>Must demonstrates skills to:</p> <ul style="list-style-type: none"> • Apply legislative, organization and site requirements and procedures for conducting • Apply basic scaffolding operations/ formworks/falseworks • Apply scaffolding operational/ formworks/falseworks safety requirements • Access, interpret and apply technical scaffolding/ formworks/ falseworks information • Maintain scaffolding/ formworks/falseworks equipment records • Apply hand-eye coordination • Operate/use relevant hand tools • Identify hazards and potential hazards at scaffolding/ formworks/ falseworks site • Communicate scaffolding/ formworks/falseworks ideas and information • Work in a team environment on site
Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> • workplace or fully equipped assessment location with necessary tools, equipment and consumable materials
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Observation/Demonstration • Interview/Oral Questions/Written exam
Context of Assessment	<p>Competence may be assessed in the workplace or in simulated workplace environment</p>

Occupational Standard: Road construction and maintenance Level I	
Unit Title	Apply Basic Concreting Works
Unit Code	EIS RCM1 11 0322
Unit Descriptor	This unit covers the knowledge, attitudes and skills required to prepare and right mix concrete. It includes selection of different materials for the preparation of the concrete

Element	Performance Criteria
1. Plan and prepare work	<p>1.1 Work instructions, including plans, specifications, quality requirements and operational details are obtained, confirmed and applied.</p> <p>1.2 Location and design of concrete works from site are identified</p> <p>1.3 Work site is cleared of debris and other waste and OHS requirements followed in accordance with safety plans and policies.</p> <p>1.4 Tools and equipment selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults are rectified or reported prior to commencement.</p> <p>1.5 Material quantity requirements are calculated in accordance with plans and/or specifications.</p> <p>1.6 Materials appropriate to the work application are identified, obtained, prepared, safely handled and located ready for use.</p> <p>1.7 Environmental protection requirements are identified for the project in accordance with environmental plans and regulatory obligations and applied.</p>
2. Select materials for concrete	<p>2.1 Location of steel reinforcement and formwork is determined from drawings and reinforcement bars schedule</p> <p>2.2 Reinforcement is checked against reinforcement drawings and specifications</p> <p>2.3 Formwork components/materials are selected consistent with job</p> <p>2.4 Fixing/fasteners are selected and used consistent with requirements of the job.</p>

3. Set-out for concrete work	<p>3.1 String lines are set accurately from existing pegs</p> <p>3.2 Grades are checked to ensure correct fall</p> <p>3.3 Services are identified and protected to prevent damage</p>
4. Construct and fit reinforcement	<p>4.1 Reinforcing fabric and bars are cut and bent as required to project drawings and specifications</p> <p>4.2 Fabric and bars are tied/fixed to configuration from project drawings and specifications</p> <p>4.3 Stiffening rods are attached to panels as required to facilitate handling</p> <p>4.4 Reinforcement material is located in formwork and placed on bar chairs/spacers as determined from drawings, noting clearance from formwork</p> <p>4.5 Cast-ins are located and secured</p>
5. Erect formworks	<p>5.1 Work area is cleared and surface prepared for safe erection of formwork</p> <p>5.2 Formwork is set out to requirements of drawings and specifications</p> <p>5.3 Formwork is assembled/erected and braced to specifications</p> <p>5.4 Expansion joints are positioned to specification</p> <p>5.5 Dowel joints are positioned to specification</p> <p>5.6 Debris, sawdust and other waste material are removed from formwork</p>
6. Carry out concrete work	<p>6.1 Concrete is placed correctly to specified levels and grades</p> <p>6.2 Concrete is compacted to specification using immersion vibrator or other specified method</p> <p>6.3 Concrete is screened, finished and curing process applied to specifications</p> <p>6.4 Concrete surface is adequately covered and protected</p>
7. Strip formwork	<p>7.1 Edge boxing and braces are removed sequentially</p> <p>7.2 Timber components are derailed, cleaned and stored or stacked</p>

	<p>7.3 Steel components are cleaned, oiled and stored or stacked</p> <p>7.4 Damaged formwork components are discarded after stripping</p> <p>7.5 Screens are safely cleaned before movement where applicable</p>
8. Clean up	<p>8.1 Work area is cleared and materials disposed of, reused or recycled in accordance with legislation/regulations/codes of practice and job specification</p> <p>8.2 Plant, tools and equipment are cleaned, checked, maintained and stored in accordance with manufacturers' recommendations and standard work practices.</p>

Variable	Range
Occupational Health and safety (OHS)	<p>This may include:</p> <ul style="list-style-type: none"> • protective clothing and equipment • use of tools and equipment • workplace environment and safety • handling of materials • use of firefighting equipment • organizational first aid • hazard control and hazardous materials and substances
Tools and Equipment	<p>Use and maintain:</p> <ul style="list-style-type: none"> • scaffolds • materials hoists • forklifts, pallet trolleys • small mixers • Vibrators • Rakes • short handle shovels • rods, hammers • hoses • buckets
Material quantity requirements	<p>Components and equipment relating to types, quantity, quality and sizes of standard and/or specialist:</p> <ul style="list-style-type: none"> • aggregate, sand, lime, cement, water, additives • hand tools and mixing plant and equipment

Materials	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • reinforcing materials, • sand • aggregates, • cement and lime gravel • concrete • formwork components • curing agents • plastic membranes
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Evidence Guide	
Critical aspects of competence	<p>Must demonstrate knowledge skills and attitude of:</p> <ul style="list-style-type: none"> • The requirements, procedures and instructions for performing basic concreting works • Implementation of requirements, procedures and techniques for the safe, effective and efficient completion of concreting works • Working with others to undertake and complete the conduct of concreting works that meets all of the required outcomes • Consistent timely completion of concreting works that safely, effectively and efficiently meets the required outcomes
Required Knowledge	<p>Must demonstrate knowledge on:</p> <ul style="list-style-type: none"> • type, uses and limitations of plant used for concreting works • concrete characteristics and properties • concreting principles and preparation techniques • structural technology • work recording techniques including specifications, check-lists and drawings; and plan reading and interpretation • setting out procedures • processes for the calculation of material requirements • compaction and stabilization techniques/methods • site and equipment safety requirements • site isolation and traffic control responsibilities and authorities • responsibilities under the environmental management plan • materials handling methods and project quality requirements • civil construction terminology
Required Skills	<p>Must demonstrates skills to:</p> <ul style="list-style-type: none"> • apply legislative, organization and site requirements and

	<p>procedures for conducting concreting works</p> <ul style="list-style-type: none"> • organize work activities • formwork erecting and dismantling • select and use relevant tools and equipment safely • identify and report work-related hazards • communicate effectively to receive and clarify work instructions
Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> • workplace or fully equipped assessment location with necessary tools, equipment and consumable materials
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Observation/Demonstration • Interview/Oral Questions/Written exam
Context of Assessment	<p>Competence may be assessed in the workplace or in simulated workplace environment</p>

Occupational Standard: Road Construction and Maintenance Level I	
Unit Title	Apply Basic Masonry Works
Unit Code	<u>EIS RCM1 12 0322</u>
Unit Descriptor	This unit covers the knowledge, attitudes and skills required to prepare and different mortars (also in regard of their usage). It includes selection of different materials for the preparation of the mortar.

Element	Performance Criteria
1. Plan and prepare work	<p>1.1 Work instructions, including plans, specifications, quality requirements and operational details are obtained, confirmed and applied.</p> <p>1.2 Location and design of masonry works from site are identified</p> <p>1.3 Work site is cleared of debris and other waste and <i>OHS requirements</i> followed in accordance with safety plans and policies.</p> <p>1.4 <i>Tools and equipment</i> selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults are rectified or reported prior to commencement.</p> <p>1.5 <i>Material quantity requirements</i> are calculated in accordance with plans and/or specifications.</p> <p>1.6 Materials appropriate to the work application are identified, obtained, prepared, safely handled and located ready for use.</p> <p>1.7 Environmental protection requirements are identified for the project in accordance with environmental plans and regulatory obligations and applied.</p>
2. Prepare materials for mortar	<p>2.1 Work platform is erected in accordance with regulatory and workplace requirements</p> <p>2.2 Construction materials are selected according to quality requirements and specifications</p> <p>2.3 Materials for mortar are selected to requirements of specification.</p> <p>2.4 Location of masonry stone/ block work/brickwork is set out on reinforced concrete footing slab in accordance with dimensions and details from job drawings</p>

	<p>2.5 Mortar is mixed in accordance with the job specifications.</p> <p>2.6 Masonry stone/ Brickwork/block work gauge is determined and set out rod /bar is prepared</p>
3. Lay bricks/ blocks and masonry stones	<p>3.1 Mortar mix is prepared and checked for conformity and applied evenly to job and set out location</p> <p>3.2 Bricks/blocks or masonry stones are located to job set out to specifications, standards and codes.</p> <p>3.3 Bricks/blocks walls or masonry stone are to be straight and true in plumb, line and level within standard tolerances and codes</p> <p>3.4 Bricks/blocks or masonry stone are laid maintaining stretcher bond throughout construction to specifications, standards and codes</p> <p>3.5 Bricks are cut</p> <p>3.6 Corners are formed maintaining bond and perpendicular intersection of both surfaces</p> <p>3.7 Reinforcement is placed and laid to bed joints to specifications, where applicable</p> <p>3.8 Brickwork/block or masonry stone work is laid and completed to job drawings, specifications, standards and codes</p>
4. Finish joints	<p>4.1 Excess mortar is removed from brick/block or masonry stone work surfaces and cavities are cleaned free of mortar and debris in accordance with manufacturers' recommendations, job specifications, standards and codes</p> <p>4.2 Joints of laid brickwork/block or masonry stone work are raked, struck or ruled to correct profile and depth to job specifications</p> <p>4.3 Brickwork/block or masonry stone work is brushed down prior to drying to remove unwanted mortar</p>
5. Erect formworks	<p>5.1 Work area is cleared and surface prepared for safe erection of formwork</p> <p>5.2 Formwork is set out to requirements of drawings and specifications</p> <p>5.3 Formwork is assembled/erected and braced to specifications</p>

	<p>5.4 Expansion joints are positioned to specification</p> <p>5.5 Debris, sawdust and other waste material are removed from formwork</p>
6. Strip formwork	<p>6.1 Edge boxing and braces are removed sequentially</p> <p>6.2 Timber components are derailed, cleaned and stored or stacked</p> <p>6.3 Steel components are cleaned, oiled and stored or stacked</p> <p>6.4 Damaged formwork components are discarded after stripping</p> <p>6.5 Screens are safely cleaned before movement where applicable</p>
7. Clean up	<p>7.1 Work area is cleared and materials disposed of, reused or recycled in accordance with legislation/regulations/codes of practice and job specification</p> <p>7.2 Plant, tools and equipment are cleaned, checked, maintained and stored in accordance with manufacturers' recommendations and standard work practices.</p>

Variable	Range
Occupational Health and safety (OHS)	<p>They May include:</p> <ul style="list-style-type: none"> • protective clothing and equipment • use of tools and equipment • workplace environment and safety • handling of materials • use of firefighting equipment • organizational first aid • hazard control and hazardous materials and substances
Tools and Equipment	<p>Use and maintain:</p> <ul style="list-style-type: none"> • scaffolds • materials hoists • forklifts, pallet trolleys • small mixers • Rakes • short handle shovels • rods, hammers • hoses • buckets

Material quantity requirements	<p>components and equipment relating to types, quantity, quality and sizes of standard and/or specialist:</p> <ul style="list-style-type: none"> • aggregate, sand, lime, cement, water, additives • hand tools and mixing equipment
Materials	<p>May include but not limited to:</p> <ul style="list-style-type: none"> • clay bricks, • masonry blocks, • masonry stone • sand • cement or lime • formwork components • curing agents

Evidence Guide			
Critical aspects of competence	<p>Must demonstrate knowledge, skills and attitude of:</p> <ul style="list-style-type: none"> • the requirements, procedures and instructions for performing basic masonry works • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of masonry works • working with others to undertake and complete the conduct of masonry works that meets all of the required outcomes • consistent timely completion of masonry works that safely, effectively and efficiently meets the required outcomes 		
Required Knowledge	<p>Must demonstrate knowledge on:</p> <ul style="list-style-type: none"> • type, uses and limitations of plant used for masonry works • masonry characteristics and properties • masonry principles and preparation techniques • structural technology • work recording techniques including specifications, check-lists and drawings; and plan reading and interpretation • setting out procedures • processes for the calculation of material requirements • site and equipment safety requirements • site isolation and traffic control responsibilities and authorities • responsibilities under the environmental management plan • materials handling methods and project quality requirements • civil construction terminology 		
Required Skills	<p>Must demonstrate skills to:</p>		
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	<ul style="list-style-type: none"> • conduct masonry works • apply legislative, organization and site requirements and procedures for conducting masonry works • organize work activities • lay blocks/bricks or masonry stone • Apply mortar mixing • form and prepare blocks/bricks • Perform formwork erecting and dismantling • select and use relevant tools and equipment safely • identify and report work-related hazards • communicate effectively to receive and clarify work instructions
Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> • workplace or fully equipped assessment location with necessary tools, equipment and consumable materials
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Observation/Demonstration • Interview/Oral Questions/Written exam
Context of Assessment	<p>Competence may be assessed in the workplace or in simulated workplace environment</p>

Occupational Standard: Road construction and maintenance Level I	
Unit Title	Conduct Road Marking and Maintenance Operation
Unit Code	EIS RCM1 13 0322
Unit Descriptor	This unit covers the conduct of road marking and maintenance operation in the civil construction industry. It includes planning; preparing surface, set out and conducting road marking or setting out and conducting speed breaker and maintenance operation, and cleaning up.

Element	Performance Criteria
1. Plan and prepare	<p>1.1 Compliance documentation relevant to the work activity are accessed, interpreted and applied</p> <p>1.2 Safety requirements from the <i>site</i> are obtained and confirmed safety plan and organizational policies and procedures, and applied to the allotted task</p> <p>1.3 Signage requirements are identified, obtained and implemented from the project traffic management plan</p> <p>1.4 Plant, tools and equipment to carry out tasks consistent with the requirements of the job are selected, checked for serviceability and rectify or report any faults</p> <p>1.5 Environmental protection requirements are identified from the project environmental management plan, and confirmed and applied to the allotted task</p>
2. Prepare surface, set out and conducting road marking or setting out and conducting speed breaker and maintenance operation	<p>2.1 Hazards and fixtures are removed from the area</p> <p>2.2 Equipment and/or product are selected and prepared for removing markings</p> <p>2.3 Location for line marking is identified</p> <p>2.4 Location for speed breaker marking is identified</p> <p>2.5 Area is cleared of dirt, debris and other contaminants</p> <p>2.6 Location for line marking is identified and set out with control points to drawings, job requirements and/or specifications</p> <p>2.7 Straight lines and curves are spotted in preparation for marking</p> <p>2.8 Pre-existing visible marks/lines are removed to specification</p> <p>2.9 Road marking or maintenance operation is conducted as per the drawing and design specifications.</p> <p>2.10 Speed breaker is installed at appropriate locations as per the</p>

	drawing and design specifications.
3. Clean up	<p>3.1 Work area is cleared and <i>materials</i> are disposed of or recycle in accordance with project environmental management plan</p> <p>3.2 Unused materials are stored in accordance with job requirements</p> <p>3.3 Plant, tools and equipment are cleaned, checked, maintained and stored</p>

Variable	Range
Relevant compliance documentation	<p>May include:</p> <ul style="list-style-type: none"> • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Safety requirements	<p>May include:</p> <ul style="list-style-type: none"> • OHS requirements in accordance with state or territory legislation and regulations, organizational safety policies and procedures, and project safety plan including: protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of firefighting equipment, use of First Aid equipment, hazard control and hazardous materials and substances • safe operating procedures including recognizing and preventing hazards associated with high voltage power lines, uneven/unstable terrain, trees, overhead service lines, bridges, surrounding buildings, obstructions, structures, facilities, dangerous materials, recently filled trenches, other machines, personnel, traffic control, working at heights, working in proximity to others, worksite visitors and the public • safe parking practices including ensuring access ways are clear, equipment/machinery is away from overhangs and refueling sites, safe distance from excavations, and secured from unauthorized access or movement • recognizing hazards and risks including uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials

	<ul style="list-style-type: none"> • emergency procedures related to equipment operation including emergency shutdown and stopping, extinguishing equipment fires, organizational first aid requirements and evacuation
Site	<p>locations may include:</p> <ul style="list-style-type: none"> • Roads • Bridges • Footpaths • Sports courts and fields • Car parks • Cycle paths • Walking tracks and similar sealed surfaces
Signage requirements	<p>May include:</p> <ul style="list-style-type: none"> • Escort vehicle • Highway traffic signs • Site safety signage • Temporary signage for the benefit of motorists and pedestrians • Traffic conditions signage
Traffic	<p>Conditions may include:</p> <ul style="list-style-type: none"> • congested urban environments • low traffic rural areas • off-road un-trafficked areas • buildings • parking sites • pedestrian areas • highways
Tools and equipment	<p>may include:</p> <ul style="list-style-type: none"> • scrapers • brooms • shovels • line grinders • Planers • sand blasters • water blasters • emulsion sprayers • water trucks • • shot blasters
Environmental protection	<p>may include:</p> <ul style="list-style-type: none"> • organizational/project environmental management plan

requirements	<ul style="list-style-type: none"> • waste management • water quality protection • noise • vibration • Dust and clean-up management
Removing	<p>may include:</p> <ul style="list-style-type: none"> • water grit blasting, • shot blasting • grinding • sand blasting • Water blasting
Line	<p>may include:</p> <ul style="list-style-type: none"> • transverse and longitudinal markings which may include: • barrier lines (one direction and both directions) • edge lines • arrows • shapes • symbols • lane lines (broken and unbroken) • separation lines (broken and unbroken) • continuity lines • turn lines • outline • stop lines • holding lines • stop and give way lines • pedestrian crosswalk lines • diagonal and chevron markings • numerals • parking areas • Kerb markings
Area	<p>may include:</p> <ul style="list-style-type: none"> • Chip seal • Asphalt • Concrete
Materials	<p>may include:</p> <ul style="list-style-type: none"> • Abrasives • Emulsions

Evidence Guide

<p>Critical aspects of competence</p>	<p>Must demonstrates knowledge skills and attitude on:</p> <ul style="list-style-type: none"> • Location, interpretation and application of relevant information, standards and specifications • Compliance with site safety plan, OH&S regulations and State/regional legislation applicable to workplace operations. • Compliance with organizational policies and procedures including quality requirements. • Preparation of surface to remove markings for new markings in accordance with drawings and specifications. This is to include any four of the following markings types; arrows, shapes, stop lines, holding lines, stop and give way lines, pedestrian crosswalk lines, diagonal and chevron markings, words, numerals, parking areas and curve markings • Preparation of surface to remove markings for new markings in accordance with drawings and specifications. This is to include any four of the following markings types; separation (broken), barrier (one direction), barrier (both directions) and edge line • Set out arranged markings for new line markings in accordance with drawings and specifications. • Set out of longitudinal markings in accordance with drawings and specifications. • Set out and conducting road marking operation • Conducting road marking or maintenance operation • Setting out and conducting speed breaker and maintenance operation • Safe and effective operational use of tools, small plant and equipment. • Communication and working effectively and safely with others. • The candidate should demonstrate, in accordance with the standard of the organizational procedures, the ability to carry out, and lead and support the implementation unit/team of the following tasks: <ul style="list-style-type: none"> ➤ Plan and prepare ➤ Prepare surface, set out and conducting road marking or setting out and conducting speed breaker and maintenance operation
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	➤ Clean up
Require knowledge and Attitude	Demonstrates knowledge and Attitude on: <ul style="list-style-type: none"> • Site and equipment safety requirements • Substrate preparation techniques and processes • Road markings • Redundant marking removal materials and primers • Equipment types, characteristics, technical capabilities and limitations • Operational, maintenance and basic diagnostic procedures • Site isolation and traffic control responsibilities and authorities • Processes for the calculation of material requirements, application rates and curing times. • Materials Safety Data Sheets and materials handling methods • Project quality requirements • Civil construction terminology • Having knowhow about traffic laws and signs.
Underpinning Skill	Must demonstrate: <ul style="list-style-type: none"> • Communication skills • Drawing interpretation skill • Measurement materials application skill
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Assessment Methods	Competency may be assessed through: <ul style="list-style-type: none"> • Interview / Written Test / Oral Questioning • Observation / Demonstration
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard: Road construction and maintenance Level I	
Unit Title	Apply 5S Procedures
Unit Code	EIS RCM1 14 0322
Unit Descriptor	This unit covers the knowledge, skills and attitude required to apply 5S techniques to his/her workplace. It covers responsibility for the day-to-day operations of the workplace and ensuring that continuous improvements of Kaizen elements are initiated and institutionalized.

Elements	Performance Criteria
1. Prepare for work.	<p>1.1. Work instructions are used to determine job requirements, including method, material and equipment.</p> <p>1.2. Job specifications are read and interpreted following working manual.</p> <p>1.3. OHS requirements, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work.</p> <p>1.4. Tools and equipment are prepared and used to implement 5S.</p> <p>1.5. Safety equipment and tools are identified and checked for safe and effective operation.</p> <p>1.6. Kaizen Board (Visual Management Board) is prepared and used in harmony with different workplace contexts.</p>
2. Sort items.	<p>2.1. Plan is prepared to implement sorting activities.</p> <p>2.2. Cleaning activities are performed.</p> <p>2.3. All items in the workplace are identified following the appropriate procedures.</p> <p>2.4. Necessary and unnecessary items are listed using the appropriate format.</p> <p>2.5. Red tag strategy is used for unnecessary items.</p> <p>2.6. Unnecessary items are evaluated and placed in an appropriate place other than the workplace.</p> <p>2.7. Necessary items are recorded and quantified using appropriate format.</p> <p>2.8. Performance results are reported using appropriate formats.</p> <p>2.9. Necessary items are regularly checked in the workplace.</p>

3. Set all items in order.	<p>3.1. Plan is prepared to implement set in order activities.</p> <p>3.2. General cleaning activities are performed.</p> <p>3.3. Location/Layout, storage and indication methods for items are decided.</p> <p>3.4. Necessary tools and equipment are prepared and used for setting in order activities.</p> <p>3.5. Items are placed in their assigned locations.</p> <p>3.6. After use, the items are immediately returned to their assigned locations.</p> <p>3.7. Performance results are reported using appropriate formats.</p> <p>3.8. Each item is regularly checked in its assigned location and order.</p>
4. Perform shine activities.	<p>4.1 Plan is prepared to implement shine activities.</p> <p>4.2 Necessary tools and equipment are prepared and used for shinning activities.</p> <p>4.3 <i>Shine activity</i> is implemented using appropriate procedures.</p> <p>4.4 Performance results are reported using appropriate formats.</p> <p>4.5 Regular shining activities are conducted.</p>
5. Standardize 5S.	<p>5.1. Plan is prepared and used to standardize 5S activities.</p> <p>5.2. <i>Tools and techniques to standardize 5S</i> are prepared and implemented based on <i>relevant procedures</i>.</p> <p>5.3. Checklists are followed for standardize activities and <i>reported to relevant personnel</i>.</p> <p>5.4. The workplace is kept to the specified standard.</p> <p>5.5. Problems are avoided by standardizing activities.</p>
6. Sustain 5S.	<p>6.1. Plan is prepared and followed to sustain 5S activities.</p> <p>6.2. Tools and techniques to sustain 5S are discussed, prepared and implemented based on relevant procedures.</p> <p>6.3. Workplace is inspected regularly for compliance to specified standard and sustainability of 5S techniques.</p> <p>6.4. Workplace is cleaned up after completion of job and before commencing next job or end of shift.</p> <p>6.5. Situations are identified where compliance to standards is unlikely and actions specified in procedures are taken.</p> <p>6.6. Improvements are recommended to lift the level of compliance in the workplace.</p> <p>6.7. Checklists are followed to sustain activities and report to relevant personnel.</p> <p>6.8. Problems are avoided by sustaining activities.</p>

Variable		Range	
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OHS requirements	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Legislation/Regulations/Codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of firefighting equipment, enterprise first aid, hazard control and hazardous materials and substances. • Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices. • Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with workplace organization. • Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.
Tools and equipment	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Paint • Hook • Sticker • Signboard • Nails • Shelves • Chip wood • Sponge • Broom • Pencil • Shadow board/Tools board
Safety equipment and tools	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Dust masks/goggles • Glove • Working cloth • First aid and safety shoes
Items	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Tools • Jigs/Fixtures • Materials/components • Machine and equipment

	<ul style="list-style-type: none"> • Manuals • Documents • Personal items (e.g. Bags, lunch boxes and posters) • Safety equipment and personal protective equipment • Other items which happen to be in the work area
The appropriate procedures	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Steps for implementing 5S (sort, set in order and shine) activities. • Written, verbal and computer based or in some other format.
Unnecessary items	<p>Are not needed for current production or administrative operation and include but not limited to:</p> <ul style="list-style-type: none"> • Defective or excess quantities of small parts and inventory • Outdated or broken jigs and dies • Worn-out bits • Outdated or broken tools and inspection gear • Old rags and other cleaning supplies • Electrical equipment with broken cords • Outdated posters, signs, notices and memos • Some locations where unneeded items tend to accumulate • In rooms or areas not designated for any particular purpose • In corners next to entrances or exists • Along interior and exterior walls • Next to partitions and behind pillars • Under the eaves of warehouses • Under desks and shelves and in desk and cabinet drawers • Near the bottom of tall stacks of items • On unused management and production schedule boards • In tools boxes that are not clearly sorted
Appropriate format	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • All items • Necessary and unnecessary items.
Red tag	<p>A format prepared with a red color paper or card which is filled and attached temporarily on the unnecessary items until decision is made. The red tag catch people's attention because red is a color that stands out. So to fill and attach red tag on items, asks the following three questions:</p> <ul style="list-style-type: none"> • Is this item needed? • If it is needed, is it needed in this quantity? • If it is needed, does it need to be located here?

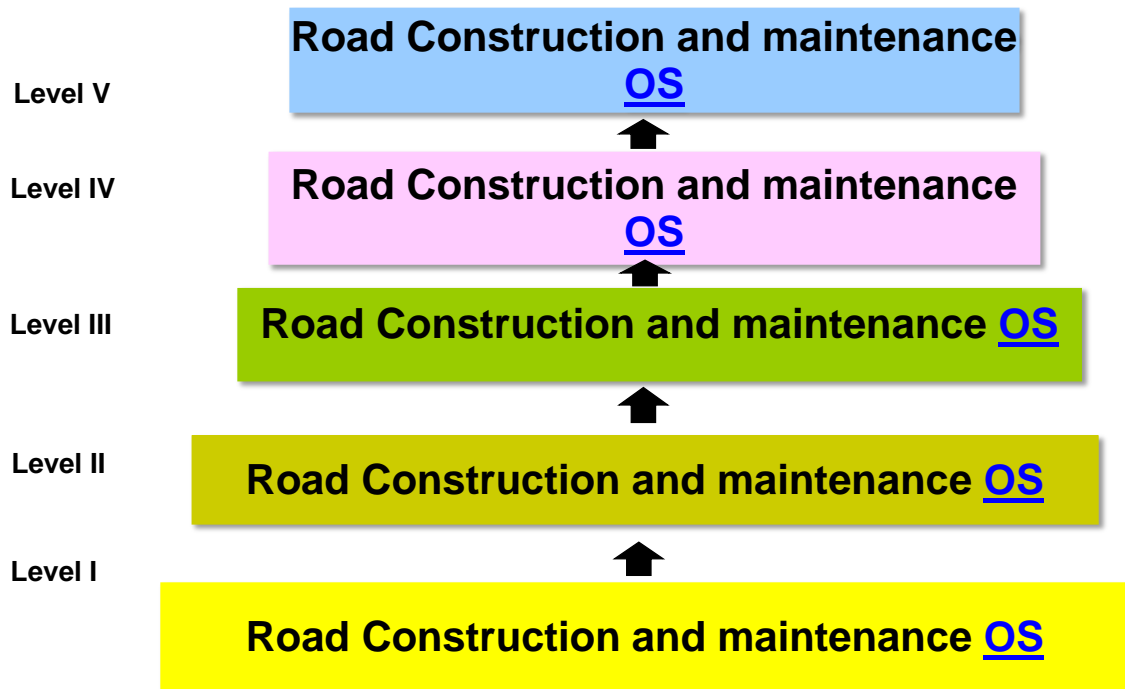
Necessary items	<ul style="list-style-type: none"> • Are required in the workplace for current production or administrative operation in the amount needed.
Shine activity	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Inspection • Cleaning • Minor maintenance May include, but not limited to: <ul style="list-style-type: none"> ➤ Tightening bolts ➤ Lubrication and Replacing missing parts
Tools and techniques to standardize 5S	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • 5S Job Cycle Charts • Visual 5S • The Five Minute 5S • Standardization level checklist • 5S checklist • The five Whys and one How approach(5W1H) • Suspension • Incorporation and Use Elimination • 5S slogans • 5S posters • 5S photo exhibits and storyboards • 5S newsletter • 5S maps • 5S pocket manuals • 5S department/benchmarking tours • 5S months • 5S audit • Awarding system • Big cleaning day • Patrolling system May include, but not limited to: <ul style="list-style-type: none"> ➤ Top management Patrol ➤ 5S Committee members and Promotion office Patrol ➤ Mutual patrol ➤ Self-patrol • Checklist and Camera patrols
Relevant procedures	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Assign 5S responsibilities • Integrate 5S duties into regular work duties • Check on 5S maintenance level

	<ul style="list-style-type: none"> • OHS measures such as signage, symbols / coding and labelling of workplace and equipment • Creating conditions to sustain your plans • Roles in implementation
Reporting	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Verbal responses • Data entry into enterprise database • Brief written reports using enterprise report formats
Relevant personnel	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Supervisors, managers and quality managers • Administrative, laboratory and production personnel • Internal/external contractors, customers and suppliers

Evidence Guide	
Required Knowledge	<p>Demonstrates skills and knowledge to:</p> <ul style="list-style-type: none"> • Discuss how to organize KPT. • Describe the pillars of 5S. • Discuss the relationship between Kaizen elements. • Implement 5S in own workplace by following appropriate procedures and techniques.
Required Knowledge	<p>Demonstrates knowledge of:</p> <ul style="list-style-type: none"> • Kaizen principle, pillars and concept • Key characteristic of Kaizen • Elements of Kaizen • Wastes/MUDA • Basics of KPT • Aims, benefits and principles of KPT • Stages of KPT • Structure and role of the components of Junior KPT • Concept and parts of Kaizen board • Concept and benefits of 5S • The pillars of 5S • Three stages of 5S application • Benefits and procedure of sorting activities • The concept and application of Red Tag strategy • Relevant Occupational Health and Safety (OHS) and environment requirements • Benefits and procedure of set in order activities

	<ul style="list-style-type: none"> • Set in order methods/techniques • Benefits and procedure of shine activities • Inspection methods • Planning and reporting methods • Method of Communication • Benefits of standardizing and sustaining 5S • Tools and techniques to sustain 5S • Ways to improve Kaizen elements • Benefits of improving kaizen elements • Relationship between Kaizen elements
Required Skills	<p>Demonstrates skills of:</p> <ul style="list-style-type: none"> • Participating actively in KPT • Technical drawing • Communication skills • Planning and reporting own tasks in implementation of 5S • Following procedures to implement 5S in own workplace • Using sorting formats to identify necessary and unnecessary items • Improving workplace layout following work procedures • Preparing labels, slogans, etc. • Reading and interpreting documents • Observing situations • Gathering evidence by using different means • Recording activities and results using prescribed formats • Working with others • Solving problems by applying 5S • Preparing and using kaizen board • Preparing and using tools and equipment to implement and sustain 5S • Improving Kaizen elements by applying 5S • Standardizing and sustaining procedures and techniques to avoid problems • Procedures to standardizing 5S activities • Analysing and preparing shop layout of the workplace • Standardizing and sustaining checklists
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	<p>Competence may be assessed through:</p> <ul style="list-style-type: none"> • Interview/Written Test • Observation/Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

SECTOR: Economic Infrastructure
SUB-SECTOR: Road Construction and Maintenance



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This occupational standard was developed on March 2022 Adama, Oromi

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