# Surface Mining
# Level-II

Based on December,2018, Version 1 OS and April, 2021, V1 Curriculum

**Module Title: - Reading plans and parameters**
**LG Code: MIN SMN2 M04 LO (1-4) LG (10-13)**
**TTLM Code: MIN SMN2 TTLM 0421v1**

April, 2021

Adama, Ethiopia

**Table of Contents**

| LG #10 | LO #1- Identify types of drawings and their functions |
|---|---|

**Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- The main types of plans and drawings used in the surface mining are identified
- Quality requirements of company operations are recognized and adhered
- Environmental controls are identified from the job plans, specifications and environmental plan

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify the main types of plans and drawings used in the surface mining
- Recognize and adhering Quality requirements of company operations
- Identify Environmental controls from the job plans, specifications and environmental plan.

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. Perform “the Learning activity performance test”
7. If your performance is satisfactory proceed to the next learning guide,

**Information Sheet 1 -Identifying the main types of plans and drawings used in the surface mining**

### 1.1. Introduction

In mininig Sector the type of plans and drawings have to be identified as per project required. Some project may require more than hundred sheets and other project may need one sheet. So, plan and drawings is very important for surface mining to achieve needed goal.

### 1.2 Drawing

Drawing is a form of visual art in which an artist uses instruments to mark paper or other two-dimensional surface. Drawing instruments include graphite pencils, pen and ink, inked brushes, colored pencils, , pastels, erasers, markers,and styluses.

**Types of Drawiing**

- ✓ Architectural
- ✓ engineering,
- ✓ electrical,
- ✓ hydraulic and
- ✓ mechanical

**NB:**Not all of these drawings is require for surface mining; it depends on the structure and complexity of the site area.

### 1.3. Plans

A plan is a view which shows the layout or arrangement of Surface mining site and other parts of the interior of a site area.

### 1.3.1.Site plan

The site plan in surface mining shows a whole part of a mining site from an overhead viewpoint.

Site plans generally include the major components of a site project such as map, topography, Scale and coverage.

- **Site Plan requirements for surface mining**
  - ✓ **Scope of work:** Need to be clearly being Proposed
  - ✓ **Site address:** Address of the proposed mining site.
  - ✓ **Site owner information:** Address of the proposed site.
  - ✓ **Easements**: location of and coordination of the site
  - ✓ **Elevation:** is its height above or below a fixed reference point, most commonly a reference geoid, a mathematical model of the Earth's sea level as an equipotential gravitational surface.
  - ✓ **Shape**: form, roundness, and surface texture. Particle form is the overall shape of particles, typically defined in terms of the relative lengths of the longest, shortest, and intermediate axes.

**1.3.2 locality Plans:**

are small-scale map of the area used to locate the site of the mining when direction to the site is considered necessary.

**1.3.3 Floor Plan**

The most important architectural drawing is floor plan. It contains more information than all the other working drawings. Basically, floor plan is a horizontal sectional view of the mining site.

**1.4.Terminology of Suface Mining.**

- **Mining:** Mining is the extraction of valuable minerals or other geological materials from the Earth, usually from an ore body, lode, vein, seam, reef, or placer deposit.
- **Open-Pit Mining-** is a surface mining technique of extracting rock or minerals from the earth by their removal from an open-air pit.
- **strip mining** - open cut or open pit surface mining that is carried on the level or along the prevailing topography in which relatively large tracts are disturbed. Usually mined with large shovels or draglines.
- **Quarry** – any open or surface workings, usually for the extraction of sand and gravel, building stone, slate, or limestone.

- **Surface mining (strip mining)** – a procedure of mining that entails the complete removal of overburden material; may generally refer to either an area and/or a contour mine.
- **Overburden –** material of any nature, consolidated or unconsolidated, that overlies a deposit of useful and minable materials or ores, especially those deposits that are mined from the surface by open cuts or pits.
- **Aggregates** – a mass or body of rock particles, mineral grains, or a mixture of both; any of several hard, inert materials, such as sand, gravel, slag, or crushed stone, mixed with a cement or bituminous material to form concrete, mortar, or plaster, or used alone, as in railroad ballast or graded fill.
- **Alluvium –** soil or sediment transported and deposited by flowing water.
- **Dragline** – an excavating machine that uses a bucket operated and suspended by cables and a boom. The bucket is dragged back toward the machine along the surface and usually operates from the highwall or above the area in which soil or spoil is being removed.
- **Panning** – to wash gravel, sand or crushed rock samples in order to isolate gold or other valuable metals by their higher density.
- **Sluice Box** – an elongate wooden or metal trough with riffles, over which alluvial gravel is washed to recover gold.
- **Placer** – a deposit of sand and gravel containing valuable metals such as gold, tin or diamonds.
- **Hydraulic Mining or Hydraulicking** – a form of mining that uses high-pressure jets of water to dislodge rock material or move sediment.

### 1.5 Maps

A map is a representation or a drawing of the earth's surface, or a part of it, on a flat surface, according to a scale. It could be hand drawn or printed. It helps us identify the places and locations within an area helping us to navigate from one place to another.

Maps are the fundamental documents in all stages of mine planning and design.

- It is used to:

✓ Correlating

- ✓ Outining
- ✓ Collecting data

### 1.5.1.Scale of Map

Maps are drawn to various scales. Scale is the ratio between the linear distances on the map and the corresponding distances on the ground.

- It can be divided in to:
- ✓ Small scasle example: 1:100
- ✓ Large scale:1:10

  **Hint:** 1:100 scale means 100m of actual distance on the ground is represented by a 1cm distance on the map.

### 1.5.2. Features of Maps

- **Feautures may include**:
- ✓ Mine structure
- ✓ Water supply
- ✓ Access road
- ✓ Location of the Ore
- ✓ Pipe line
- ✓ Location of drill hole(optiona)
- ✓ Dump location

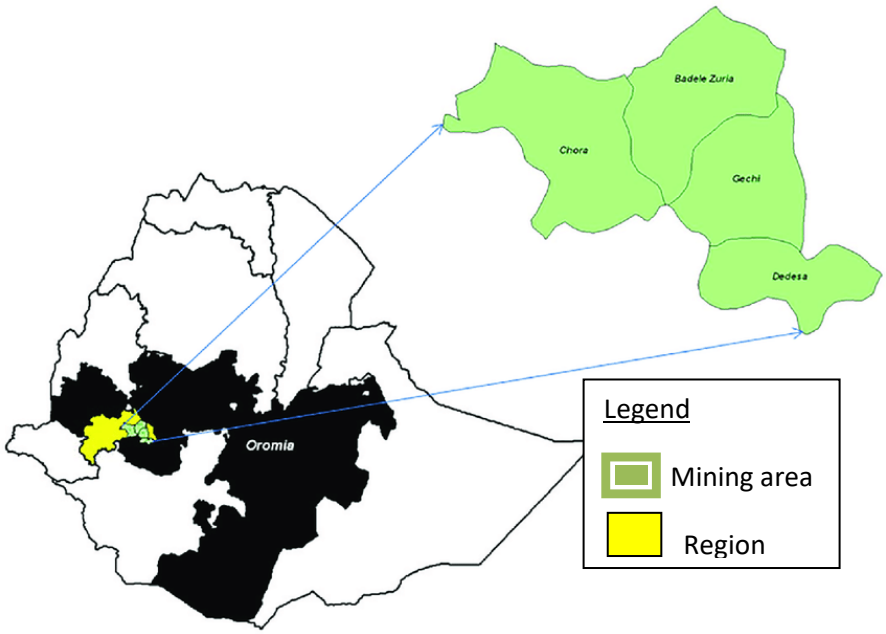



Fig1. Example  map of the mining area

| Self-check 1 | Written test |
|---|---|

**Directions:** Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

**Test I Short Answer Questions**

1. List features of map 2pts)

2. List types of Plan and drawing?(2pts)

**Test II Write true if the statement is correct and false if statement is incorrect**

1. A map is a representation or a drawing of the earth's surface, or a part of it, on a flat surface, according to a scale. It could be hand drawn or printed.. (2pts)

***Note:*** **Satisfactory rating – 6 points** **Unsatisfactory – 6 below points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

**Information Sheet 2- Recognizing and adhering Quality requirements of company operations**

## 2.1. Company quality requirements

A quality requirement refers to a condition or a capability that must be present in a requirement. They represent that which is needed to validate the successful completion of a project deliverable.

- So, It is very Important for surface mining adhere to the quality standards that are prescribed, to insure that:

✓ safety and reliability of their products and services
✓ complying with regulations, often at a lower cost
✓ defining and controlling internal processes
✓ meeting environmental objectives
✓ quality matches expectations
✓ fit for purpose
✓ needs of their users

At a minimum each company must determine how they will put in place policies and procedures to ensure that all mandatory standards are complied with.
Surface Mining companies will have a quality management system, often with personnel dedicated to managing it. A key part of this system is the quality manual which should be kept in the head office or site office of the mining area.

## 2.2. Quality management

Quality management is the act of overseeing all activities of mining and tasks needed to maintain a desired level of excellence. Quality management includes the determination of a quality policy, creating and implementing quality planning and assurance, and quality control and quality improvement.

Process of ensuring that an organization or product is consistent. It can be considered to have four main components: quality planning, quality control, quality assurance, and quality improvement. Quality management is focused not only on product/service quality, but also the means to achieve it.

### 2.3. The Principles of Quality Management

Quality management adopts a number of management principles that can be used by top management to guide their organizations towards improved performance. The principles include:

- **Customer focus**: Since the organizations depend on their customers, they should understand current and future customer needs, should meet customer requirements, and try to exceed the expectations of customers. An organization attains customer focus when all people in the organization know both the internal and external customers and also what customer requirements must be met to ensure that both the internal and external customers are satisfied.
- **Leadership**: Leaders of an organization establish unity of purpose and direction of it. They should go for creation and maintenance of such an internal environment, in which people can become fully involved in achieving the organization's quality objective.
- **Involvement of people**: People at all levels of an organization are the essence of it. Their complete involvement enables their abilities to be used for the benefit of the organization.
- **Process approach**: The desired result can be achieved when activities and related resources are managed in an organization as process.

- **System approach to management**: An organization's effectiveness and efficiency in achieving its quality objectives are contributed by identifying, understanding, and managing all interrelated processes as a system.
- **Continual improvement**: One of the permanent quality objectives of an organization should be the continual improvement of its overall performance.
- **Factual approach to decision making**: Effective decisions are always based on the data analysis and information.
- **Mutually beneficial supplier relationships**: Since an organization and its suppliers are interdependent, therefore, a mutually beneficial relationship between them increases the ability of both to add value.

## 2.4 Total Quality Management (TQM)

Total quality management (TQM) is an integrative philosophy of management for continuously improving the quality of products and processes.

- Satisfying the customer involves making sure both internal and external customers are happy.
- The internal suppliers are the subordinates who answer to a particular supervisor. Satisfying them involves giving them the tools and motivation they need to do their jobs.
- It is important to go beyond satisfaction, making the customer – and supplier – feel important and valued, and part of the process.
- "Lean" focuses on eliminating the wasteful use of time, energy or resources, and instead focusing activities completely on the creation of value.
- The focus of the Six Sigma management strategy is to reduce defect by minimizing variation in processes.

### 2.4.1 Basic Principles of Total Quality Management

The basic principles for the Total Quality Management philosophy of doing business are to satisfy the customer, satisfy the supplier, and continuously improve the business processes.

- Satisfy the Customer
- Continuous Improvement
- Reducing Waste
- Satisfy the Supplier

| Self-Check – 2 | Written test |
|---|---|

**Directions:** Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

**Test I: Short Answer Questions**

1. List at least Three Principles of Quality Management(3pts)
2. List at least four Quality standards on one organization (3pts)

***Note:*** **Satisfactory rating - 6 points** **Unsatisfactory - below 6points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

## Information Sheet 3- identifing Environmental controls from the job plans, specifications and environmental plan

### 3.1 Identify Environmental Controls

It is very important that you identify and apply the environmental controls for the project you are working on. They can be found in:

- Job plans.
- Job specifications.
- Environmental plans and procedures for the worksite or Surface mining area.

Environmental controls are used onsite to ensure the protection of the environment. Make sure you check with your supervisor about what environmental issues need to be managed during your mining.

All environmental details should be listed in an 'Environmental Management Plan' for the site. It can include details for:

- Waste management.
- Water quality protection.
- Vibration control.
- Dust management.

The plan will outline the steps and processes needed to prevent or minimize damage to the environment through the use of machinery and equipment.

**Environmental controls could include:**

- ✓ Soil and water management, including clearing and grubbing tasks, erosion and sediment control, drainage management and water licensing.
- ✓ Waste management.
- ✓ Environmental sensitivity and heritage factors.

- ✓ Air quality.
- ✓ Flora and fauna management, including protected species management.
- ✓ Demolition management, including dust control, noise management, vibration minimization and blasting requirements.
- ✓ Vegetation protection.
- ✓ Storm water management.
- ✓ Weed control measures.
- ✓ Chemical and hazardous substance storage requirements.
- ✓ Other requirement relevant to tasks and activities.

### 3.2. Environmental management plans

During the planning stage of any project you must consider the impact the project will have on the environment and take action to reduce that impact. Environmental Management Plans will address these issues. These plans describe how the site will be set up and managed in relation to:

- the protection of / land/ trees of historical significance
- avoiding/ minimizing disturbance of places of cultural significance
- the protection of endangered fauna and flora
- the protection of delicate vegetation
- management of deliveries
- material storage
- waste storage
- storm water management
- erosion and sediment management
- waste removal
- site clean up
- site rehabilitation e.g. repair of footpaths

| Self-Check – 3 | Written test |
|---|---|

**Directions:** Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

**Test II:write true if the statement is correct and false if the statement is incorrect**

1.Environmental controls are used onsite to ensure the protection of the environment(2)

2.Environmental controls does not include Soil and water management(2)

3.Environmental Management Plans will address these environment and take action to reduce that impact(2)

***Note:*** **Satisfactory rating – 6 points** **Unsatisfactory - below 6 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

| LG #11 | LO #2- Recognize commonly used symbols and abbreviations |
|---|---|

**Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Recognizing Mining symbols and abbreviations
- Locating legend on project drawings

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, **you will be able to**:

- Recognize Mining symbols and abbreviations
- Locate legend on project drawings

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

## Information Sheet 1- Recognizing Mining Symbols and Abbreviations

### 1.1.Introduction

**Abbreviations and symbols**

Most of the surface Mining drawings need to convey a lot of information. To avoid confusion and to save space, abbreviations and symbols are used. These are standardized (used all over the world), and you'll find that you soon become used to interpreting what they mean.

### 1.2 Abbreviations

Abbreviations can be created in different ways. In some cases the word is shortened. Examples include 'MIN' for MINIMUM.

In other cases initials are used. Examples include '**FFE**' for Finished Floor Elevation and **'VC'** for Vertical Curve.

There might be several recognized abbreviations for the same thing. For example, you may see 'brickwork' shortened to BRK, BWK or just BK.

If you come across a new abbreviation in a drawing and you aren't sure what it means, have a look at where it is in the drawing as that will often give you a clue.

Example 1 – table 2.1 Common Abbreviations used in mining drawings

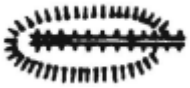
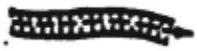
| | | | |
|---|---|---|---|
| AU | Gold | W | WEST |
| A.C. | Asphalt Concrete | MAX | Maximum |
| CF | Cubic Foot | MIN | Minimum |
| CP | Control Point | N | North |
| KM | KILOMETER | PRP | Property Corner |
| M | Metre | PVC | Polyvinyl Chloride |
| DIA | Diameter | PVI | Point Of Vertical Intersection |
| E | East | R | Radius |
| ELEV | Elevation | ROW | Right-Of -Way |
| S | South | W | West |
| FT | Foot | VC | Vertical Curve |

### 1.3 Symbols

Like abbreviations, symbols are used instead of words on drawings to save space. There are a lot of them, but they're standardized (drawn the same way) to avoid confusion, so don't worry. Some of them look a lot like what they represent. For example, the symbol:

Indicates a hamer for Mining Quarry

***Example 2 – Common symbols used in mining Maps***

| Symbol | Represented | Symbol | Represented |
|---|---|---|---|
|  | Dumps and steep slopes |  | Intermittent lakes |
|  | Dump and car track |  | Reservoir and dam |
|  | Fills |  | Ditch |
|  | Open cuts |  | Water tank |
|  | Stripping |  | Oil pipe (Brown color) |

| | | | |
|---|---|---|---|
|  | Open pits and depression contours |  | Oil pipe (Yellow color) |
|  | Sand and sand dunes |  | Contours.<br>(every fifth contour accented) |
|  | Lakes or ponds | | |

**Fig 2.1**

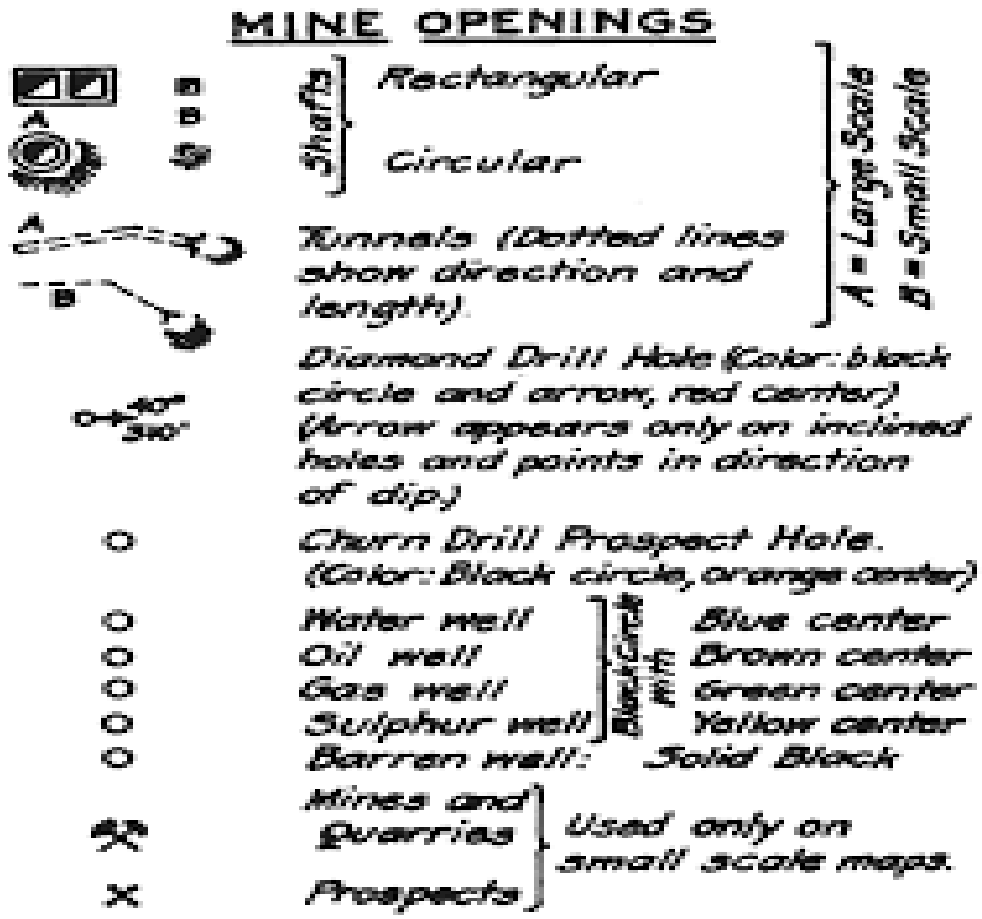



**Fig 2.2**

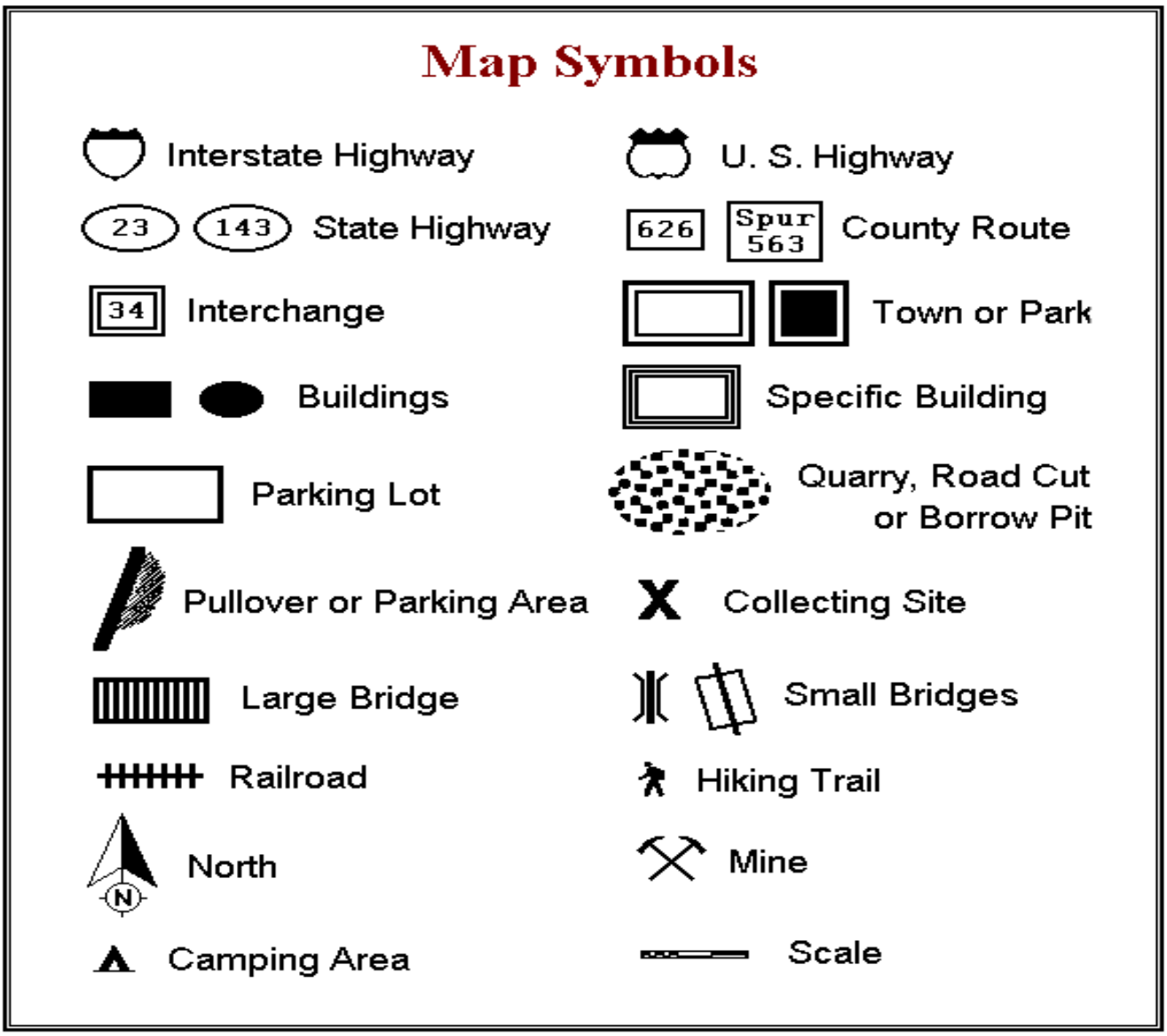

Map Symbols
Interstate Highway
U. S. Highway
23
143
State Highway
626
Spur
563
County Route
34
Interchange
Town or Park
Buildings
Specific Building
Parking Lot
Quarry, Road Cut
or Borrow Pit
Pullover or Parking Area
Collecting Site
Large Bridge
Small Bridges
Railroad
Hiking Trail
North
Mine
Camping Area
Scale

**Fig 2.3**


**Fig 2.4**

Fig 2.5. Mining machinery and man on working symbol

## Information Sheet 2- Locating legend on project drawings

some drawings have a legend to indicate what the symbols used on the drawing mean.

The legend shown in Figure below is from a site plan. Without this legend, the symbols on the drawing could be misinterpreted.

Electrical, hydraulic and engineering drawings commonly have legends on them.

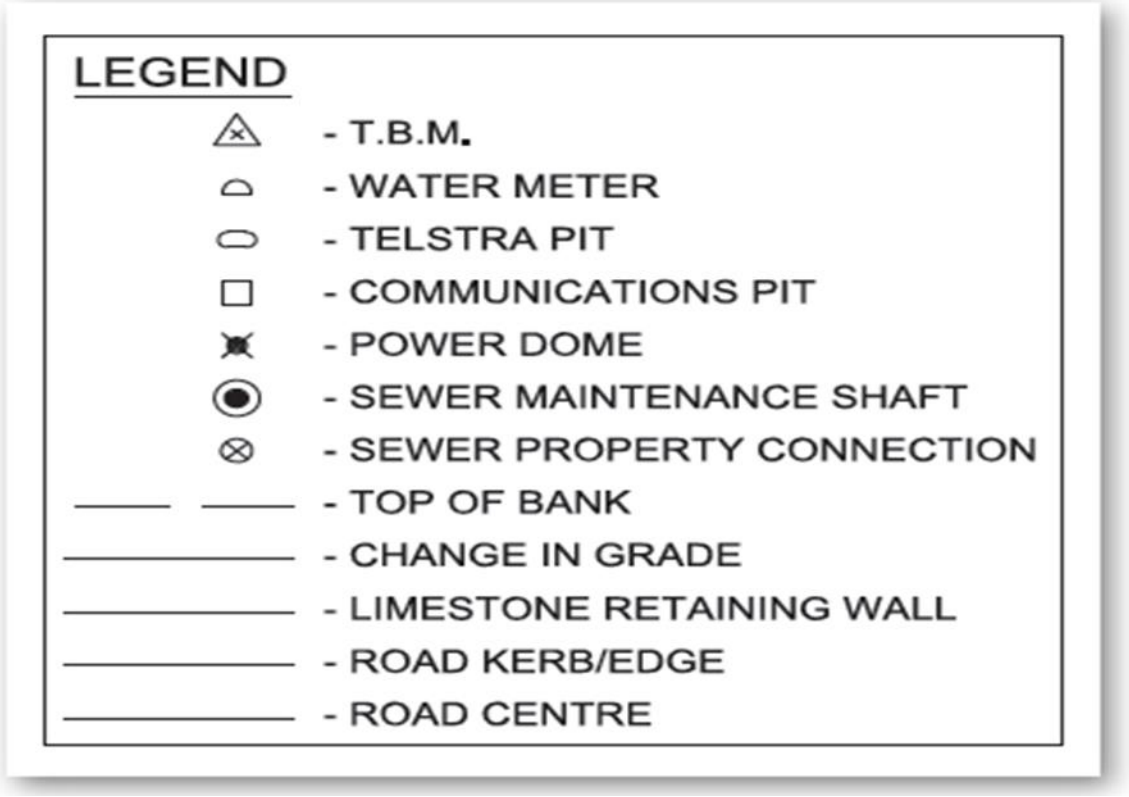



*Figure 2.6: A legend from a site plan showing several symbols and their meanings.*

***Example 2 – Common Legends used in mining Drawings for existing features***

| | |
|---|---|
|  | Existing Topographic Contours (1' Interval) |
|  | Topographic Contours After Removal Of 4" Of Topsoil (1' Interval) |
|  | Existing Property Boundary |
|  | Existing Road Right-Of-Way |
|  | Existing Fence line |
|  | Existing Unpaved Road |
|  | Existing Cattle Guard |
|  | Existing Gas Utility |
|  | Existing Overhead Electric |
|  | Existing Underground Electric |
|  | Existing Water Spigot |

***Fig2.7***

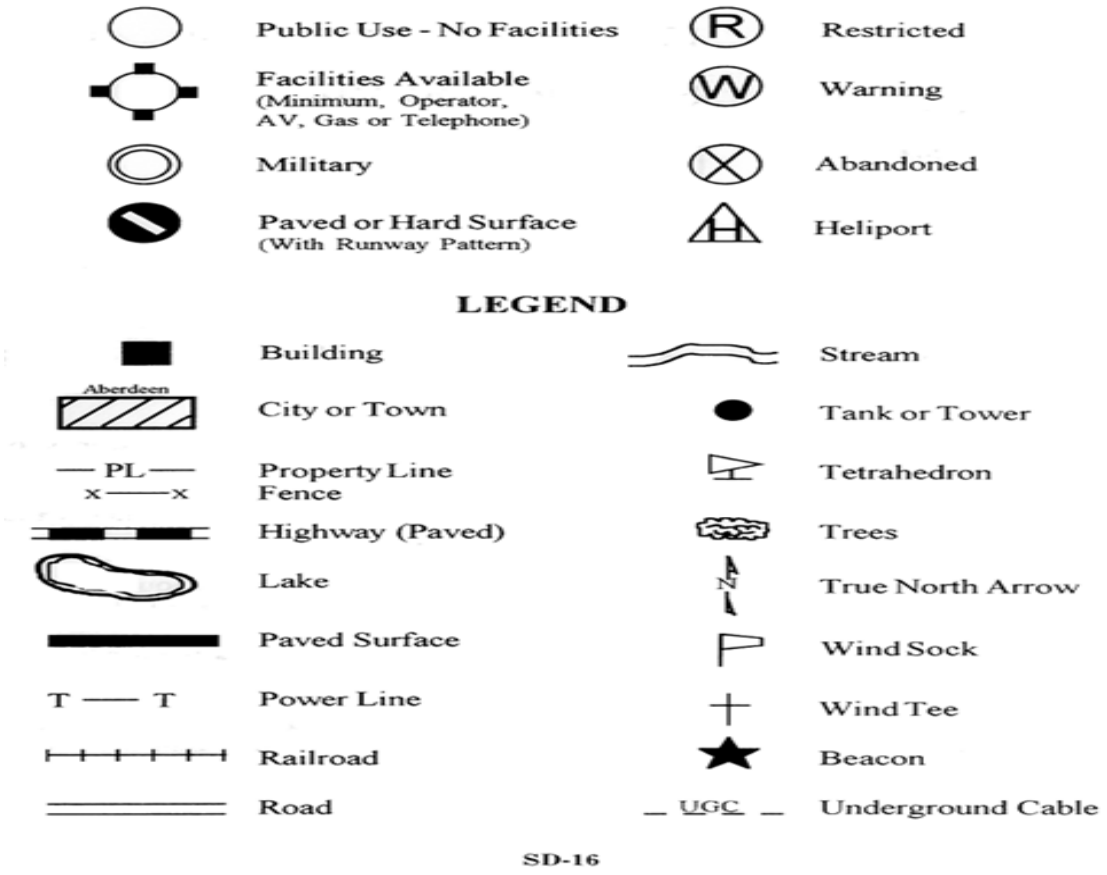

Public Use - No Facilities
Facilities Available
(Minimum, Operator, AV, Gas or Telephone)
Military
Paved or Hard Surface
(With Runway Pattern)
R
Restricted
W
Warning
Abandoned
Heliport
LEGEND
Building
Aberdeen
City or Town
PL
Property Line
Fence
Highway (Paved)
Lake
Paved Surface
T T
Power Line
Railroad
Road
Stream
Tank or Tower
Tetrahedron
Trees
N
True North Arrow
Wind Sock
Wind Tee
Beacon
UGC
Underground Cable
SD-16

**Fig 2.8**

| Self-Check – 1 | Written test |
|---|---|

Name…… ID…… Date…….

**Directions:** Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

**Test I: Shor Answer Questions**

1. What is the function of Abbreviations used in mining drawings?(2)
2. What is the function of Symbols used in mining Maps?(2)
3. Write at least Five Common Abbreviations used in mining drawings(3)
4. List at least Five Common symbols used in mining Maps(2)

***Note:*** **Satisfactory rating - 9 points** **Unsatisfactory - below 9 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

**Answer sheet**

**Test I**

1._____

2. _____

3._____

4._____

| LG #12 | LO #3- Locate and identify key features on a site plan |
|---|---|

**Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Achieving orientation of the plan
- Identifying and locating key features on site map
- Gaining access to site
- Identifying main features, contours and datum

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, **upon completion of this learning guide, you will be able to**:

- Achieve orientation of the plan
- Identify and locating key features on site map
- Gain access to site
- Identify main features, contours and datum

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
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6. sheets
7. Perform “the Learning activity performance test”
8. If your performance is satisfactory proceed to the next learning guide,

## Information Sheet 1- Achieving orientation of the plan

### 2.1. Orientation

Orientation is the positioning of a work site in relation to seasonal variations in the sun's path as well as prevailing wind patterns.

Good orientation can increase the energy efficiency of your site, making it more comfortable to stay in and cheaper to run.

### 2.2 Principles of good orientation

- Good orientation, combined with other energy efficiency features, can reduce or even eliminate the need for auxiliary heating and cooling, resulting in lower energy bills, reduced greenhouse gas emissions and improved comfort. It takes account of summer and winter variations in the sun's path as well as t Good orientation can help reduce or even eliminate the need for auxiliary heating and cooling, resulting in lower energy bills, reduced greenhouse gas emissions and improved comfort.
- Ideally, choose a site or office with good orientation for your climatic and regional conditions and build or renovate to maximize the site's potential for passive heating and passive cooling, adjusting the focus on each to suit the climate. For those sites that are not ideally orientated, there are strategies for overcoming some of the challenges.
- In hot humid climates and hot dry climates with no winter heating requirements, aim to exclude direct sun by using trees and adjoining buildings to shade every façade year round while capturing and funneling cooling breezes.
- North orientation is generally desirable in climates requiring winter heating, because the position of the sun in the sky allows you to easily shade northern façades and the ground near them in summertime with simple horizontal devices such as eaves, while allowing full sun penetration in winter.
- North-facing walls and windows receive more solar radiation in winter than in summer. As shown in the diagram, the opposite is true for other directions — and

why, in mixed or heating climates, it is beneficial to have the longer walls of a house facing north to minimize exposure to the sun in summer and maximize it in winter.

## 2.3. Choosing the best orientation

Prioritize your heating and cooling needs. Are you in a climate that requires mainly passive heating, passive cooling, or a combination of both?

Compare your summer and winter energy bills, consult an architect or designer, ask your local energy authority or refer to local meteorological records.

Your local climate research should study:

- Temperature ranges, both seasonal and diurnal (day–night)
- Humidity ranges
- Direction of cooling breezes, hot winds, cold winds, wet winds
- Seasonal characteristics, including extremes
- Impact of local geographic features on climatic conditions (see choosing a site)
- Impact of adjacent buildings and existing landscape.

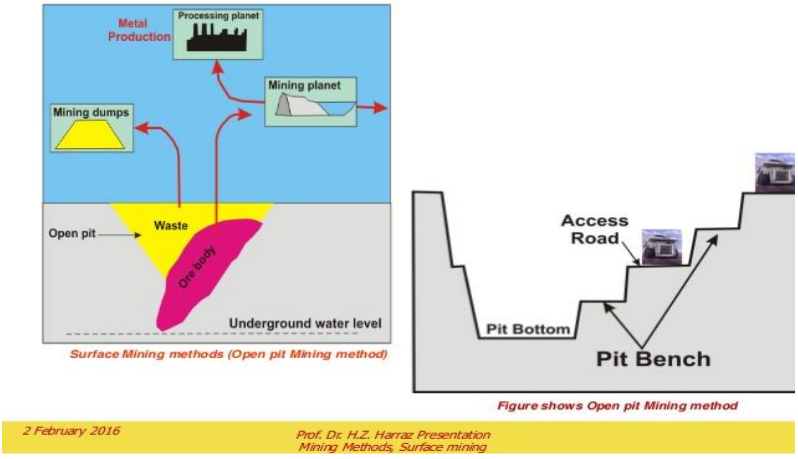



Fig 2.3 surface-mining-planning-and-design-of-open-pit-minin orientation

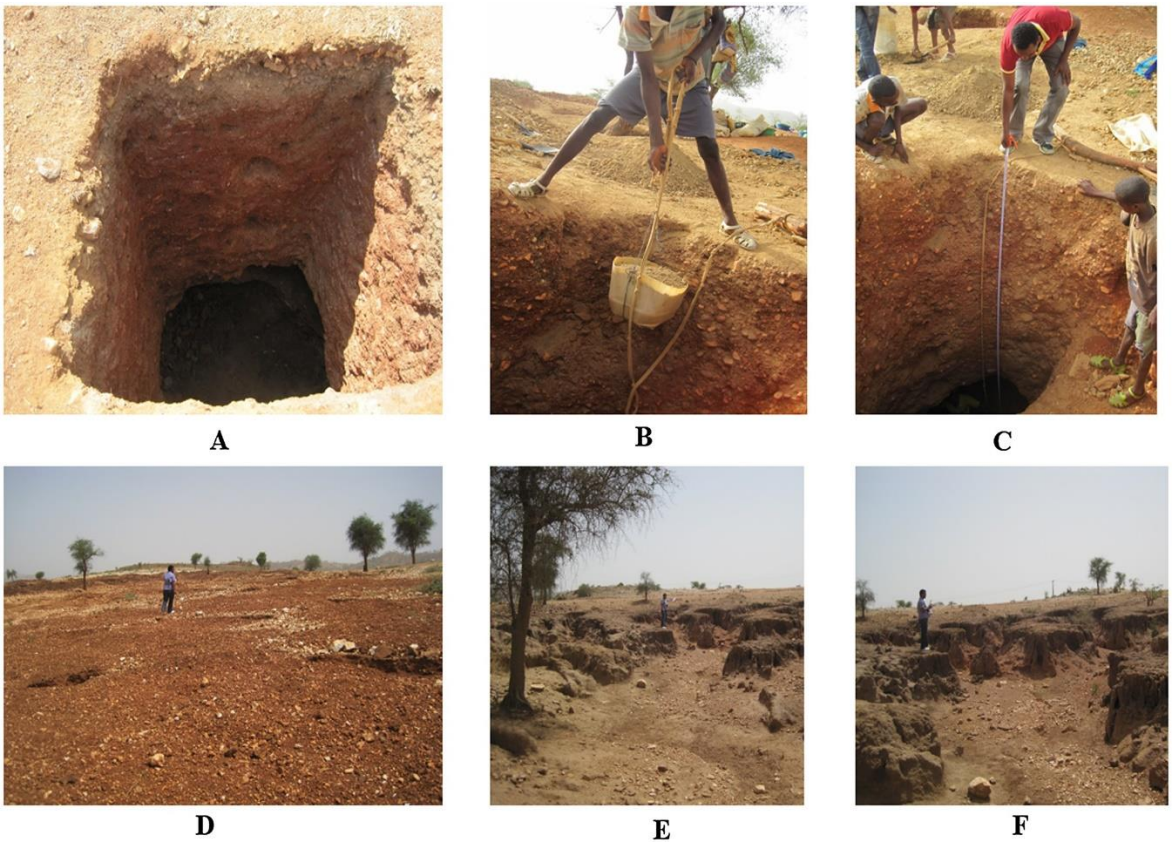



Fig 2.4 Artisinal Open pit mining

Fig 2.5Ope pit coal mining

Fig 2.6 open pit mining

| Self-Check – 2 | Written test |
|---|---|

Name…… ID……. Date…….

**Directions:** Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

**Test I short answer**

1. What does mean Orientation of the plan?(2)

2. What is the advantage of Good orientation?(2)

3. List at least 3 Principles of good orientation(2)

*Note:* Satisfactory rating - 6 points Unsatisfactory - below 6 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

**Answer Sheet**

Name: _____ Date: _____

**Test I**

1. _____
2. _____
3. _____

**Information Sheet 2- Identifying and locating key features on site map**

## 3.1. Key Features on a site Map

Site maps identify numerous ground features, which can be grouped into the following categories:

**Relief:** mountains, valleys, slopes, depressions as defined by contours

**Hydrography:** lakes, rivers, streams, swamps, rapids, fall

**Vegetation:** wooded areas

**Transportation:** roads, trails, railways, bridges, airports/airfield, seaplane anchorages

**Culture:** buildings, urban development, power transmission line, pipelines, towers

**Boundaries:** international, provincial/territorial, administrative, recreational, geographical

**Toponymy:** place names, water feature names, landform names, boundary names

- Refer to the map legend for a complete listing of all features and their corresponding symbols. Information along the map borders provides valuable details to help you understand and use a topographic map. For example, here you will find the map scale and other important information about the map such as the year, the edition and information pertaining to the map data.
- Additinally,Key features may include:

✓ type of product/service
✓ quantities
✓ characteristics
✓ sizes
✓ pattern dimension
✓ location
✓ surfaces and compatibility

## 3.2. Meanings of Colors on the Map

A variety of colors can be found on a map, each relating to different types of features.

- **Black** shows cultural features such as buildings, railways and power transmission lines. It is also used to show geographical names, certain symbols, geographic coordinates and precise elevations.

- **Blue** represents water features, such as lakes, rivers, falls, rapids, swamps and marshes. The names of water bodies and water courses are also shown in blue, as are magnetic declination and UTM grid information.
- **Green** indicates vegetation such as wooded areas, orchards and vineyards.

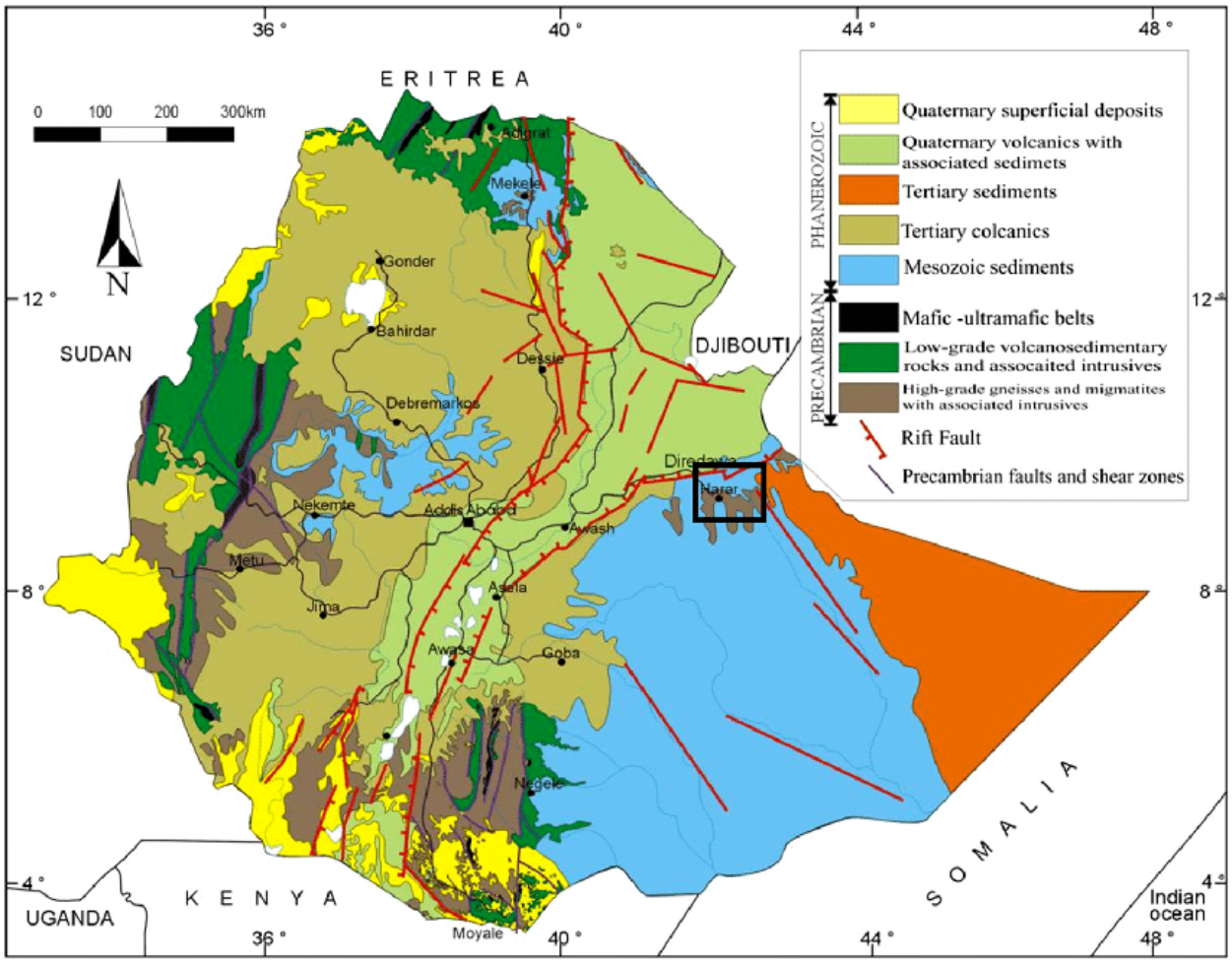



Fig 3.1 map Ethiopia that shows different colrs Geological map

| Self-Check – 3 | Written test |
|---|---|

Name…… ID…… Date…….

**Directions:** Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

**Test I**
**Short answer**

1. What are the key features of the site plan (write at least three)(2)
2. What is the Meanings of Colors on the Map(Green, Black, and Blue) (2)

**Note: Satisfactory rating - 64points** **Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

**Answer Sheet**

Name: _____ Date: _____

**Test I**

1. _____
2. _____

| Information Sheet - 3 | Gaining Access to Site |
|---|---|

## 5.1 Moving around the workplace

An effective way of getting to know your new workplace is to learn how to safely move around it. As an employee you need to be aware of certain rules of access and the safest way of getting around.

A map must show all the relevant information related to navigating a workplace. It is very important that you are familiar with your workplace for various reasons. This is so you can:

- react properly in case of an emergency or accident
- move around the Mining site appropriately
- save time by taking the best route
- be aware of the areas that are restricted or require protective equipment
- know your location at anytime
- avoid getting confused or lost

The typical information contained in a site map includes:

- boundaries (fences, walls and so on)
- gates (entries and exits)
- roads, walkways, declines, shafts
- emergency muster locations and escape routes
- location of emergency equipment (firefighting and first aid, emergency phones)
- speed limits
- restricted areas

You should always follow the directions of your supervisors(**Site manager**) and of any signs or barricades on the work site when it comes to where you are and are not allowed to be present.

These directions are designed to keep everyone on the site safe and to allow the site to carry out its operations effectively.

| Self-Check -5 | Written Test |
|---|---|

**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

**Answer the following questions Neatly and clearly (3 point Each)**

1. Your instructor will give you a copy of a typical site plan. Use this to locate as many of the following as possible on your site(3)

- boundaries
- gates (entries and exits)
- roads, walkways, declines, shafts
- emergency muster locations and escape routes
- location of emergency equipment (firefighting and first aid, emergency phones)
- speed limits
- restricted areas

2. Why is it important to have a map and an understanding of how to move around your workplace?_____

_____

***Note:*** **Satisfactory rating – Above 5 points** **Unsatisfactory - below 5 points**

Score = _____

Rating: _____

Name: _____ Date: _____

**Short Answer Questions**

| Information Sheet - 4 | Identifying Main Features, Contours and Datum |
|---|---|

### 6.1 Detail Surveys

Contour drawings for construction drawings are used so as the designers can determine the best position of the proposed building horizontally and vertically.

They are usually prepared by surveyors on drawings called detail surveys. As the name implies the purpose of the drawing is to detail the features of the site such as,

- Direction of fall of the land
- Location of Trees
- Location of existing structures
- Location of services
- Location of any other features that may affect the design & placement of the building

### Understanding Contours

**Contours Lines** - are imaginary lines that joint points of the same height above the **datum** (points of equal elevation. They allow a person viewing the plan which is 2 dimensional to form an impression of its 3 dimensional shape.

It is important that the contours refer to a datum so as construction based on the design will be built at the appropriate height.

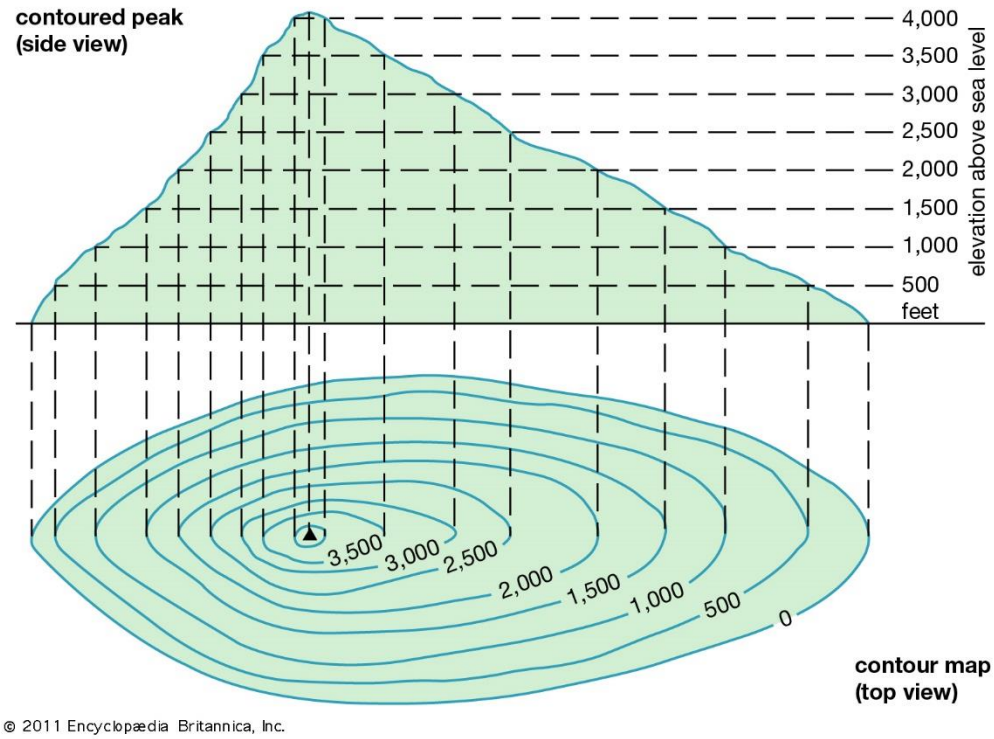



*Figure xx. Contour Lines*

**Contour Interval** – the contour lines represent the height of the land in the form of a Reduced Level above the datum. Each contour will represent a different Reduced Level, so an impression of the shape of the land can be formed the contours must be determined at a regular intervals. This is the Contour Interval.

The excerpt from a site plan gives an example of the contour interval; in this case it is 200mm

# Contour Interval

What does "contour interval " mean?

– The value between two consecutive lines

**Contour Interval = C.I.**

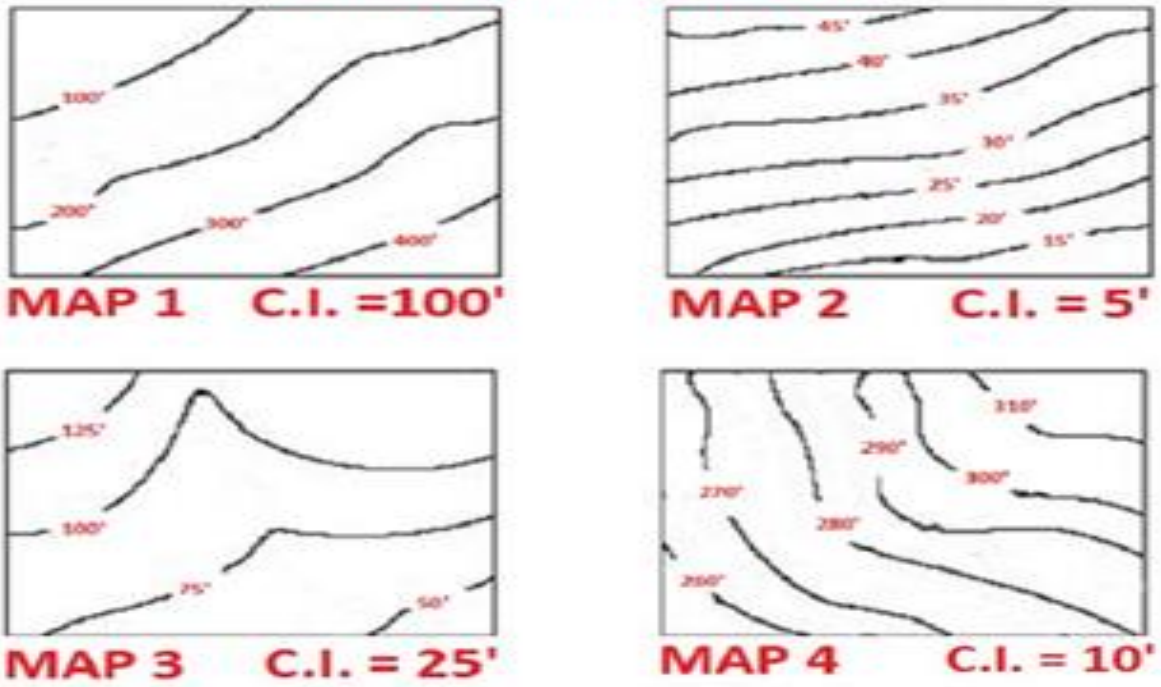



*Figure xx. Contour interval*

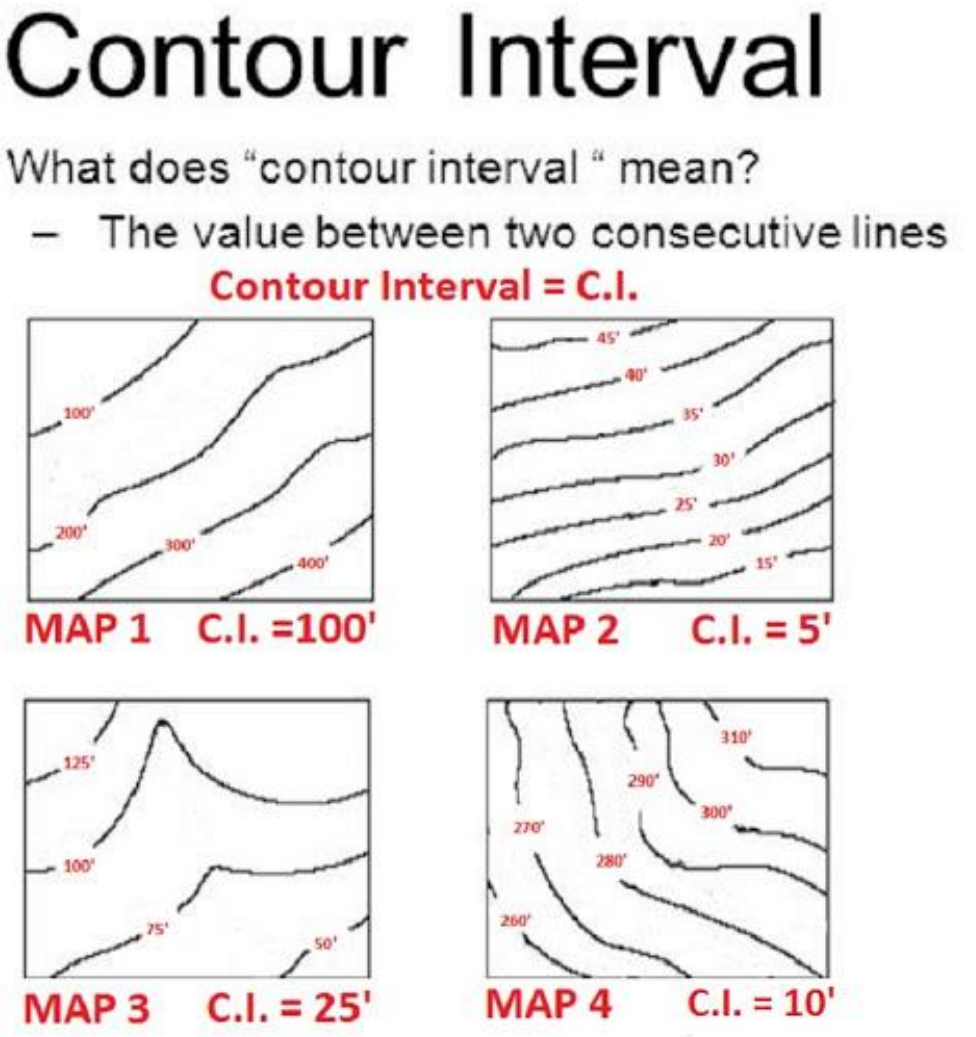
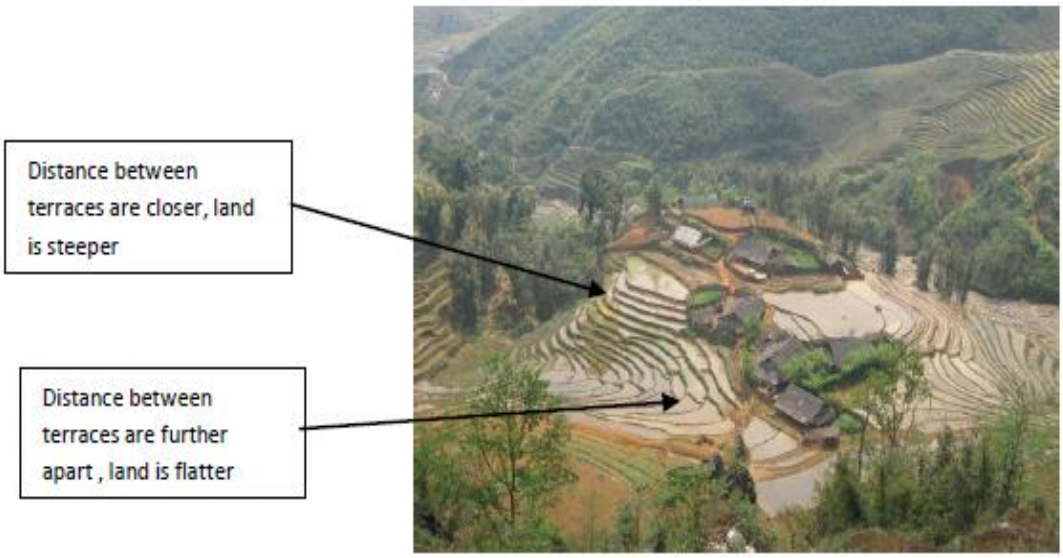



Figure xx. Contour interval

Interpreting Contours


Distance between terraces are closer, land is steeper
Distance between terraces are further apart , land is flatter

| Self-Check -6 | Written Test |
|---|---|

**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

**Say true if the statements is correct and say false if the statement is incorrect**

1. Contours Lines are imaginary lines that joint points of the same height above the datum
2. Contour drawings for construction drawings are used so as the designers can determine the best position of the proposed building horizontally and vertically
3. Datum is points of equal elevation

***Note:*** **Satisfactory rating – Above 5 points** **Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

**Answer Sheet**

Score = _____

Rating: _____

Name: _____ Date: _____

**Short Answer Questions**

| LG #13 | LO #4- Read job specifications |
|---|---|

**Instruction sheet**

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Identifying job specifications from drawings, notes and descriptions
- Identifying work standards
- Identifying material attributes from specification

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, **upon completion of this learning guide, you will be able to**:

- Identify job specifications from drawings, notes and descriptions
- Identify work standards
- Identify material attributes from specification

**Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. Perform “the Learning activity performance test” If your performance is satisfactory proceed to the next learning guide,

| Information Sheet 1 | Identifing Job Specifications from Drawings, Notes and Descriptions |
|---|---|

## 1.1 Introduction

A specification sets out the technical requirements of the work. It is a direct explanation of the drawings and with them serves three purposes:

- First, as a full description of the project.
- Second, as a mandatory requirement for materials and quality of workmanship during construction.
- Third, as legal evidence in the event of litigation.

The specifications also form part of the tender documents both of which are part of the Contract Documents.

## 1.2.Job Specification Categories

Surface mining site Construction job specifications fall into three categories:

- Materials
- Workmanship
- Machinery.

## 1.3 Material Specifications

These cover the type and quality of each material required in the project together with its treatment and testing by the supplier.

### A. Workmanship Specifications

These cover the use of these materials in the project, their fabrication into the structure, the method and order of their installation, the quality of labor to be employed, the standard of workmanship required, and the tolerances permitted.

## B. Machinery Specifications

These cover the capacity, performance, and operation of all permanent plant to be installed under the contract mining, and the commissioning tests necessary to demonstrate its adequacy.

A specification may comprise at least three or four parts:

a) General Clauses covering the scope of the work, any special conditions, design criteria, and the like
b) Materials, including tests
c) Mining or Construction workmanship and tests
d) Machinery and commissioning tests

In each part the sections of work are dealt with in some predetermined sequence; the actual sequence is of no importance, nor is the arrangement of the various parts of the specification, but consistency throughout the document makes for easy reference and clarity of expression.

In some types of contract the methods of measurement and payment must also be specified.

Set out in this example is an extract from typical specification.

Your employer, Trainer- Assessor may be able to provide a copy of a recent projects specification.

**Table 1.1 sample of specifications for mining truck (Machinery)**

| Specification | Value |
|---|---|
| *Engine* | |
| Engine model | CAT 3516B HD |
| Gross power (kW) | 1801 |
| Net power (kW) | 1743 |
| *Weights-approximate* | |
| Gross weight (tonnes) | 384 |
| Nominal payload (tonnes) | 240 |
| *Body capacity* | |
| Struck ($m^3$) | 96 |
| Heaped ($m^3$) | 129 |

| Self-Check -1 | Written Test |
|---|---|

**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

**Answer yhe following questions neatly and clearly ( 3 point Each)**

1. Write the three categories Construction job specifications?(3)

***Note:*** **Satisfactory rating – Above 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

**Answer Sheet**

Score = _____

Rating: _____

Name: _____ Date: _____

| Information Sheet - 2 | Adapt to changing work conditions |
|---|---|

## 2.1.Change Work Conditions

An amendment (change) is a change to a project that is decided after the drawings have been finalized or during mining. These changes could happen because the client requests them (for example, the client may want an extra work in the mining area) or because the Project may realizes for the matter of market until it is better for selling the product. if it's done slightly differently. Either way, they need to be shown on paper so that everyone knows about them, they are mining or costructed correctly and there are no arguments later. So obviously it is important to use the latest version of the plans.

If this means that the mning area or building will vary from the way it was shown in the original contract documents, a written instruction will be issued by the architect/client and, if necessary, the drawings will be amended (changed) and re-issued

| Self-Check -2 | Written Test |
|---|---|

**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

**Answer yhe following questions neatly and clearly ( 3 point Each)**

1. What does mean An amendment (change) in a project work
2. Why amendments occur in project work or mining ste?

***Note:*** **Satisfactory rating – Above 3 points** **Unsatisfactory - below 3 points**

You can ask you teacher for the copy of the correct answers.

**Answer Sheet**

Score = _____

Rating: _____

Name: _____ Date: _____

| Information Sheet-3 | Identifying Standards of work, finishes and tolerances from the project specifications |
|---|---|

## 3.1 Specification

A specification describes in detail the standards to which the project should conform. It is used in conjunction with the working drawings. Specifications are written up by an architect, structural engineer, consultant or company employed to complete the project. The specifications are finalized after consultation with the client to ensure the structure can be completed to the satisfaction of the client. Well prepared specifications will save both time and money.

**Australian Standards** describe the minimum requirements and relevant sizes of all structural components. Most companies will meet these standards as a part of their commitment to deliver a quality product. In addition to providing a record of the client's requested standards, specifications are also used for:

- estimating
- tendering
- on site instruction
- complying with statutory requirements
- preparing contracts
- dispute resolution

➢ Specifications should:

- refer to mining as per drawings or other relevant documents
- refer to relevant Australian Standards
- include quality control procedures if applicable
- include rules for substitution if applicable
- detail quality of products such as:
  - ✓ types of material
  - ✓ composition of material

- ✓ characteristics of material
- ✓ grades of material
- ✓ color and style of material
- ✓ treatments and finishes
- ✓ include tolerances
- ✓ describe methods of fabrication
- ✓ detail methods of installation

## 3.2 Standard

According to the National Institute of Standards and Technology (NIST) Circular No. A-119, Revised, a standard is "the definition of terms; classification of components; delineation of procedures; specification of dimensions, materials, performance, designs, or operations; measurement of quality and quantity in describing materials, processes, products, systems, services, or practices; test methods and sampling procedures; or descriptions of fit and measurements of size or strength."

## 3.3 Code

A code is a standard that has been enacted into law by a local, regional, or national authority having jurisdiction so that the Mining site manager, engineer or contractor is legally obligated to comply with the code. Noncompliance can result in being prosecuted. The code may be an industry, government, or voluntary consensus-based standard.

A code can include references to standards, which means the standards are incorporated by reference and therefore are part of the code and legally enforceable.

### 3.4 company quality requirements

It is essential that mining projects adhere to the quality standards that are prescribed. This is for many reasons such as to ensure that:

- Workers are safe whilst work is being carried out
- The mined mineral is safe
- The mineral is fit for market as per needed.

### 3.4.1 Quality standards can include:

- Ethiopian Standards
- Australian Standards
- Codes
- manufacturer's specifications
- Organizational standards
- Quality accreditation e.g. ISO9000
- Clients who have specify particular standards.

At a minimum each company must determine how they will put in place policies and procedures to ensure that all mandatory standards are complied with. In addition to this, professional companies will also put in place systems to ensure that the standards they wish to adhere to are met.

Large surface mining companies will have a quality management system, often with personnel dedicated to managing it. A key part of this system is the quality manual which should be kept in the head office or site office.

Even small companies must have methods to ensure that the work that they carry out meets the quality standards required. Whilst processes may not be documented, clear and consistent ways of completing tasks can help to ensure a quality outcome.

| Self-Check -3 | Written Test |
|---|---|

**Directions:** Answer all the questions listed below. Use the Answer sheet provided in the next page:

**Say true if the statements is correct and say false if the statement is incorrect ( 2 point Each)**

1. A specification describes in detail the standards to which the project should conform
2. Specifications should not refer to mining drawings or other relevant documents
3. A code is a standard that has been enacted into law by a local, regional, or national authority

***Note:*** **Satisfactory rating – Above 6 points** **Unsatisfactory - below 6 points**

**Answer Sheet**

Score = _____

Rating: _____

Name: _____ Date: _____

**Short Answer Questions**

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- *Workbook - CPCCBC 4012A Read and interpret plans and specifications*- NSW Department of Education and Training © Customized by Pacific Institute of Technology

## AKNOWLEDGEMENT

We would like to express our appreciation to the TVET instructors and experts of regional TVET bureau, TVET College, and Federal Technical and Vocational Education and Training Agency (FTVETA) who made the development of this learning module with required standards and quality possible.

We wish thanks and appreciation to the representatives of BEAR II UNESCO PROJECT who covers the financial expenses, scarifying their time and commitments to develop this learning module.

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