RESEARCH ARTICLE OPEN ACCESS

Preparation of Topographic Map on selected Area Acase Study Assosa University

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Abstract

A topographic map shows the varying shapes, heights and slopes of a landscape using contour lines. Contours are lines that connect points at the same height above sea level and are plotted using software. The closer these contours are the steeper the gradient. However, the height difference between one line and the next is always the same throughout the map. Topographic maps Assosa University also detail both the natural and human features of a landscape; Natural features include tree and spot height while man-made features include roads, fences, buildings and greens area. The preparation of topographic map of this project is depends on natural feature, manmade feature of ASU using satellite image by Google Earth and generate data by GIS software. General topographic map shows the feature of earth surface on the paper by using their symbol, color, size and different shape.

Keywords;Topographicmap;GoogleEarth;GISsoftware

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Introduction

1. Background

A map is representation of the earth, or part of it. Maps have been used for human being for long time. From cave/wall paintings, ancient maps of Babylon and Greek philosophers, through the Age of Exploration, and on into the 21st century, people have created and used maps as the essential tools to help them define, explain and navigate their way through the world. Topographic map have proved to be effective, legitimate and convincing media to demonstrate to external agencies how community value, understands interacts with its traditional lands and immediate space. Since the 1600s, topographic mapping has become an integral part of a country's cartography. These maps (called topo maps for short) remain among the most valuable maps for government and the public alike. A map is a way of representing on a two-dimensional surface, (a paper, a computer monitor, etc.) any real-world location or object. Many maps only deal with the two-dimensional location of an object without taking into account its elevation. Topographic maps on the other hand do deal with the third dimension by using contour lines to show elevation change on the surface of the earth, (or below the surface of the ocean).The concept of a topographic map is, on the surface, fairly simple and more than shown contours. Contour lines placed on the map represent lines of equal elevation above (or below) a reference datum. To visualize what a contour line represents, picture a mountain (or any other topographic feature) and imagine slicing through it with a perfectly flat, horizontal piece of glass. (pike, January ,1992)

A topographic map is a two-dimensional representation of a three- dimensional land surface. Topographic maps are differentiated from other maps in that they show both the horizontal and vertical positions of terrain. Through a combination of contour lines, colors, symbols, labels,, and other graphical representations, topographic maps portray the shapes and locations of mountains, forests, rivers, lakes, cites, roads, bridges, and many other natural and manmade features. They also contain valuable reference information for surveyors and map makers, including bench marks. Source: (U.S Department of Interoir, Juley 1996). The location of the features is known as plan meter 2 and the configuration of the terrain is known as topography. Topographic map used for design of road, construction of building, determining the positions on the surface of the earth of human made and natural features, determine the configuration of the terrain and to find the necessary data for the construction of a graphical portrayal of topographic features. (N., February 1998)

1.2 Statement of the problem

The preparation and application of topographic map should have updated and digitized after some years or as its necessity. In our university or other sectors there is no good tone about editing and digitizing the earlier topographic map.so, this research will solve these problems by digitizing and updating the new features exist on the university.

This research will solve various problems for the university and the department of surveying

Even though an updated and accurate topographic map should be needed to express all features of any organization, now Assosa University map does not include the new infrastructures like new buildings, new road and other facilities that leads the project inaccurate way

1.3 General objective

The general objective of the project is preparation of topographic map of Assosa University with the aid of modern surveying instruments and software (mainly Google Earth, differential GPS and GIS). And also, to show the new features which appear after some years

1.4 Specific objective

- To show the overall features which exist in this compound
- To compare the new topographic map from the oldest one
- To show the new features which are not present in the old topographic map

1.5 Research question

- How can we describe or show each and every feature of ASU on map?
- How can we distinguish the changes between the existing and the new map?
- What is the main role of showing a new feature which doesn't exist before?

1.6 Scope of the project

The physical area of the project encompasses all features to be recognized that are compounded by ASU fence. The Topographic Map is showing all natural and manmade features of the ASU which are traced on Google Earth and processed in GIS software. All the on-going improvements and construction at the University should be shown as well as the future land expansion and development areas. And this topographic map also can deeply explain and show the new features which are built in ASU for many years and other features like: tree, opens space, and another features.

1.7 Significance of the research

Topographic maps are used for different activities and the Topographic Map of the Assosa University might prove beneficial to the whole community specifically for the surveying Department students.

It helps for a tourist and other organizations which visit our university because; by using this map they simply can understand the universities position.

Literature review

The history of topographic mapping

Some of the earliest known maps were made in Mesopotamia, in the area now known as Iraq, where a series of maps showing property boundaries were drawn in about 2400 B.C. for the purpose of land taxation. A roman map dating from about 335-366 A.D. showed such topographical features as roads, cities, rivers, and mountains. The word topography is derived from the Greek words topo's, meaning a place, and grapier, meaning to write. Thus topography is the written, or drawn, description of a place. Although the basics of land surveying were known as early as 1200 B.C and perhaps even earlier, the use of surveying techniques in preparing maps was limited to cities and other small-scale areas. Larger-scale maps were prepared from sketches or journals kept by explorers and sometimes reflected more imagination than observation. As a result, the exact position of points on a map was often grossly in error. In 1539, the Dutch mathematician and geographer Reiner gamma frisius described a method for surveying an area by dividing it into triangles. This concept of triangulation became one of the basic techniques of field surveying and is still used today. One of the first largescale mapping projects using triangulation was started in the 1670 by Giovanni Domenico Cassini, who had been persuaded to make a detailed map of France. After Cassini death, his children and grandchildren continued to labor on the project. The final result, called the carte de Cassini was published in 1793 and was the first accurate topographic map of an entire country. Its only shortcoming was the general lack of elevation measurement, other than a few spot elevations determined by measuring the variation in air pressure with altitude using a barometer. The concept of contour lines to show different elevations on a map was developed by the French engineer J.L. dupaintriel in 1791. Although this method allowed the accurate depiction of land contours and elevations on flat, two-dimensional map, it was not widely used until the mid-1800s. (http://www.wisegeek.com/)

The user of the map should be able to interpret the map as a model of the ground. Topographic surveying and the preparation of a topographic map of the terrain is therefore generally the first step in the planning and designing of a major civil engineering project. (Liwan, 1985)

Topographic terminology

Bearing: The horizontal angle at a given point, measured clockwise from magnetic north or true north to a second point.

Classified road's: Roads for which surface type, width and use are identified.

Contour lines: Lines on a map connecting points of equal elevation above mean sea level; using contour lines, relief features can be profiled into a three-dimensional perspective.

Elevation: Vertical distance from a datum (usually mean sea level) to a point or object on the earth's surface.

Horizontal datum: The positional reference or basis for the geographic location of features on a map.

Legend: A description, explanation table of symbols, or other information, on a map or chart to provide a better understanding and interpretation of it.

Magnetic north: Direction to which a compass needle points.

Mean sea level: The average height of the surface of the sea for all stages of tide, used as a reference surface from which elevations are measured.

National Topographic System: An orderly index system suitable for a series of maps of different scales for the coverage of Canada.

Projection: Geometric representation of the curved surface of the Earth on a flat sheet of paper.

Relief: The physical configuration of the Earth's surface, depicted on a topographic map by contour lines and spot heights.

Spot elevation: A point on a map where height above mean sea level is noted, usually by a dot and elevation value; it is shown wherever practical (road intersections, summits, lakes, large flat areas and depressions).

Symbols: A diagram, design, letter or abbreviations, placed on maps, that (by convention, usage or reference to a legend) is understood to stand for or represent a specific feature or object.

Topography: Surface features both natural and man-made, collectively depicted on topographic maps.

Unclassified roads: Roads for which the surface is unidentified. For more definitions and useful information on topographic maps, visit the National Topographic Series Polychrome Map Standards and Specifications. (Liao, 1999)

2.4.1 What information is on a topographic map

Topographic map identifies numerous ground features, which can be grouped in to the following categories: Relief: mountains, valley, slope, depression as defined by contour. Hydrography: Lakes, river, stream, swamps, rapids, falls Vegetation: wooded area Transportation: road, trials, railways, bridges, airport, Culture: building, urban development, power transmission line, pipeline, towers. Boundary: international, provincial/territory, administrative, recreational, geographical. Refer to the map legend for a complete listing of all features and their corresponding symbol. Information along the map borders provides valuable details to help you understand and use a topographic map

Data and geographic information system (GIS)

Data in many different forms can be entered into GIS. Data that are already in map form can be included in GIS. This includes such information as the location of rivers and roads, hills and valleys. Digital, or computerized, data can also be entered into GIS. An example of this kind of information is data collected by satellites that show land use the location of farms, towns, or forests. GIS can also include data in table form, such as population information. GIS technology allows all these different types of information, no matter their source or original format, to be overlaid. Putting information into GIS is called data capture. Data that are already in digital form, such as images taken by satellites and most tables, can simply be uploaded into GIS. Maps must be scanned, or converted into digital information. GIS must make the information from all the various maps and sources align, so they fit together. One reason this is necessary is because maps have different scales. A scale is the relationship between the distance on a map and the actual distance on Earth. GIS combines the information from different sources in such a way that it all has the same scale. No projection can copy the reality of Earth's curved surface perfectly. Different types of projections accomplish this task in different ways, but all result in some distortion. To transfer a curved, three-dimensional shape into a flat surface inevitably requires stretching some parts and squeezing other parts. A world map can show either the correct sizes of countries or their correct shapes, but it can't do both. GIS takes data from maps that were made using different projections and combines them so all the information can be displayed using one common projection. (Buckley, 1997)

What Are the Key Advantages of Topographic Mapping?

Topographic mapping or survey plays a crucial role in determining opportunities and assessing unpredictable issues when undergoing any project. Whether the project is of building monuments and landmarks, topography mapping is an important tool helping geological engineers for planning, agricultural, and other areas. One of the benefits of using this tool is it shows comprehensive information about the region, late and rating forms the surface of the earth.

Methodology and data processing

Location of the area

The location of the project area located in Assosa region in the state of Benishangul Gumuz western part of Ethiopia at the earth distance 675 km North West of Addis Ababa at Assosa town. Straddles the border between Ethiopian highland and South Sudan. It astronomical location is 10° 17' N and 34° .52' E whilst elevation 1575 meters above sea level. There are different features or objects that can be found such as building, road, green area, tree and storage. These buildings are divided into different parts depending on their location and service. The first one is the building found around the mechanical department Area, lab class and work shop with different design. The second one is the building around the female dormitories and male dormitories. The shape (design) of these buildings is different. The third building of natural science Library & social science Library has the different shape, and the building of cafeteria and the building found around the Registrar are different in shapes. Generally, on Topographic of ASU different manmade and natural object which can be found with different use and service. There are also different trees.

Average weather condition of the study area

In Assosa, the wet season is warm and overcast and the dry season is hot and partly cloudy. Over the course of the year, the temperature typically varies from 57°F to 92°F and is rarely below 53°F or above 97°F.

Based on the tourismscore, the best time of year to visit Assosa for warm-weather activities is from mid October to early February.

Temperature

The hot season lasts for 2.8 months, from January 31 to April 25, with an average daily high temperature above 88°F. The hottest day of the year is March 19, with an average high of 92°F and low of 65°F.

The coolseason lasts for 3.6 months, from June 21 to October 8, with an average daily high temperature below 76°F. The coldest day of the year is December 29, with an average low of 57°F and high of 84°F.

Clouds

In Assosa, the average percentage of the sky covered by clouds experiences significant seasonal variation over the course of the year.

The clearer part of the year in Assosa begins around October *2* and lasts for 6.1 months, ending around April 5. On December 17, the clearest day of the year, the sky is clear, mostly clear, or partly cloudy 58% of the time, and overcast or mostly cloudy 42% of the time.

The cloudier part of the year begins around *April 5* and lasts for *5.9* months, ending around October 2. On July25, the cloudiestday of the year, the sky is overcast or mostlycloudy 83% of the time, and clear, mostly clear, or partly cloudy 17% of the time.

Rainfall

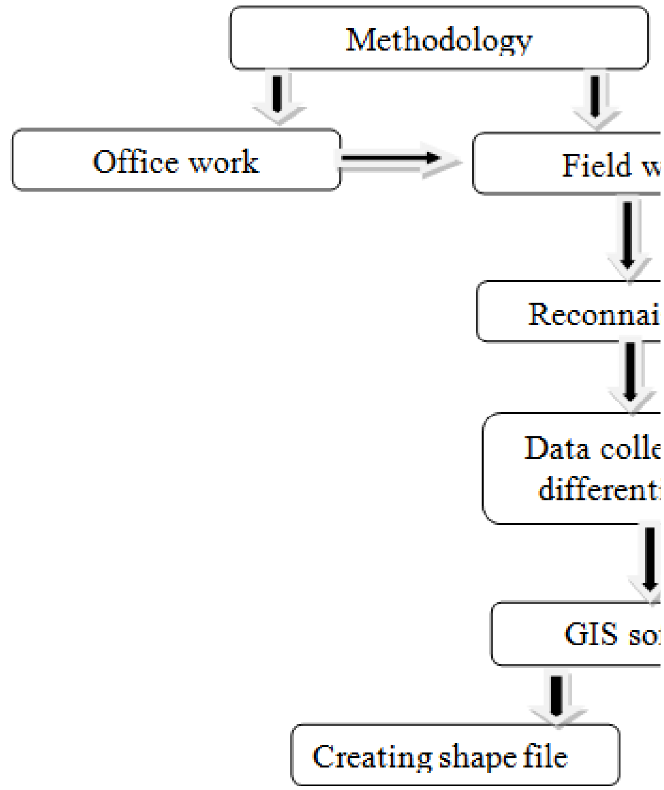
To show variation within the months and not just the monthly totals, we show the rainfall accumulated over a sliding 31-day period centeredaround each day of the year. Assosa experiences extrem*e* seasonal variation in monthly rainfall.

The rainy period of the year lasts for 7.8 months, from March 24 to November 18, with a sliding 31-day rainfall of at least 0.5 inches. The most rain falls during the 31 days centeredaround August 12, with an average total accumulation of 8.6 inches.

The rainless period of the year lasts for 4.2 months, from November 18 to March 24. The *least* rain falls around January 4, with an average total accumulation of 0.1 inches. (https://weatherspark.com/y/98142/, 2020)

Sun

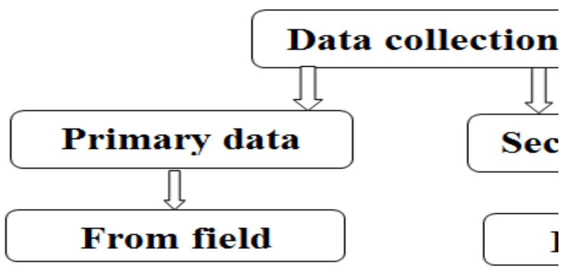
- The length of the day in Assosa does not vary substantially over the course of the year, staying within 42 minutes of 12 hours throughout. In 2021, the shortest day is December 21, with 11 hours, 32 minutes of daylight; the longest day *is* June 21, with 12 hours, 43 minute*s* of daylight.rge projects, pipe laying, construction, and others.



Field work

The first method is to reconnaissance the project area or to visit the area, to draw the free hand sketch for doing the next steps. Reconnaissance is visiting the area before collecting the data from the site location area. This reconnaissance is very necessary for the project before start the work to know about the project benefits and effects rapidly up to the society. The second method is data collection: -data collection is the gathering information from the particular source for the various purposes. This data collection is used different techniques:

- Field data collection
- Recording the coordinates



Office work

There are different types of office work can be done during preparation of topographic map. In our project, digitizing Topographic map is one of. The data get in Google Earth and invisible data take in GPS then digitize the topographic map by using GIS software. Before digitizing Google Earth data add placement of ASU. First of all set up window device software on the computer then start digitizing topographic map on google earth. Generally different material or software is used in the preparation of topographic map.in our case we used mainly Arc GIS and Google Earth software. GIS software is the main objective to start the future work to prepare topographic map of Assosa University. The data can be collected from Google earth and save it one by one with their identical symbol, building in polygon, tree and pole in point by it color then export in to GIS software all digitized data can be processed. The project is compiled basically with the following software. These include:

- Google Earth
- GIS software

The last preparation of Topography map is performed by using GIS software. The process of the map layouts is preformed and all the map elements are inserted into the final Topographic map.

Instruments for field work

<u>Differential GPS</u>

When GPS was first being put into service, the US military was concerned about the possibility of enemy forces using the globally available GPS signals to guide their own weapon systems. Originally, the government thought the "coarse acquisition" (C/A) signal would give only about 100-metre (330 ft), but with improved receiver designs, the actual accuracy was 20 to 30 meters (66 to 98 ft). Starting in March 1990, to avoid providing such unexpected accuracy, the C/A signal transmitted on the L1 frequency (1575.42 MHz) was deliberately degraded by offsetting its clock signal by a random amount, equivalent to about 100 meters (330 ft) of distance. This technique, known as *Selective Availability*, or SA for short, seriously degraded the usefulness of the GPS signal for non-military users. More accurate guidance was possible for users of dual-frequency GPS receivers which also received the L2 frequency (1227.6 MHz), but the L2 transmission, intended for military use, was encrypted and was available only to authorized users with the decryption keys.

Data processing

After collection of basic data and information like coordinates of each building corner, fences, road curves, trees, poles and spot height data by using Google Earth next the data processing. The processing methods of the collected data are as follows:

1. Collecting by differential GPS
2. Importing
3. Digitizing
4. Exporting the output map

Collecting by differential GPS

The Global Positioning System (GPS) is really an arrangement of 27 satellites orbiting the earth. Only 24 are operational — there are three extras in case any of the satellites fail. Each solar-powered satellite orbits the earth twice a day and is arranged so that there are at least four satellites visible in the sky from any location. These satellites are responsible for transmitting geographic data to receivers in our GPS devices. But how is that data collected?

The Process

The GPS we use today collects geographic data from satellite and aerial images, and from data collectors who drive around the globe. GPS receivers use triangulation, a mathematical method of determining position, to find a user's precise location on earth and create a digital map of the surrounding area.

Result and discussion

Result

The map is a graphical representation, at an established scale, of a part of the earth's surface, showing important natural and manmade features in their correct positions relative to a coordinate reference system and to each other.

The map design is dependent on the raw data that can be collected from the field using different instrument and the collected data transferred into a computer using different software. So, topographic map design can be started from this raw data. However, data collection is only the first step.

The map design is very important because map is a form of communication. The map reader sees the geographic image on the map and to know the feature that found on the map with full description reader person is easily understand. Unlike verbal communication in which the speaker or writer can control the sequence in which information is transmitted and received, the map maker has little control over how the map user will view and interpret the map. So, the map user can understand the information of map that can be included in the map description.

The map includes the following points:

- Clarity
- Order
- Balance

4.2 Topographic map elements

Elements that are found generally on all maps, specifically on topographic maps include the distance or scale, direction, legend, sources of information and how the map was processed, and orientation and location.

4.2.1 Features shown on topographic maps

There are different topographical features found in the area of ASU under the category of the following

- **Polygon**
- **Line**
- **Point**

Polygon

A feature used to represent areas. A polygon is defined by the lines that make up its boundary and a point inside its boundary for identification. Polygons have attributes that describe the geographic feature they represent. In ASU, buildings were represented under this polygon features. Assosa University have different buildings like Office, class room, workshop, dormitory, cafeteria, store etc. that are shaped in linear and L-shape and G+2 building size. There are institution and public service which are existed in the area. This is described in the map below.

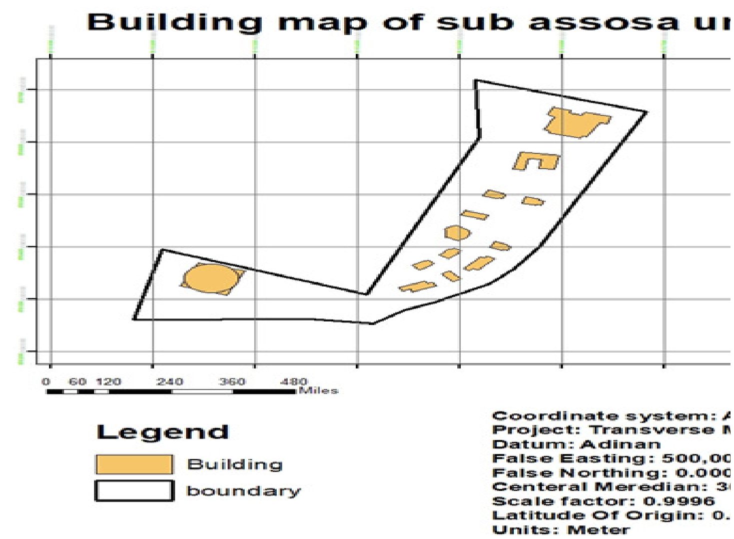


Figure 1 Building map

Line

A set of ordered co-ordinates that represents the shape of geographic features too narrow to be displayed as an area at the given scale (contours, street centerlines, or streams), or linear features with no area (county boundary lines). A line is synonymous with an arc.

Generally, in ASU is road features, pedestrian and Ditches features area.

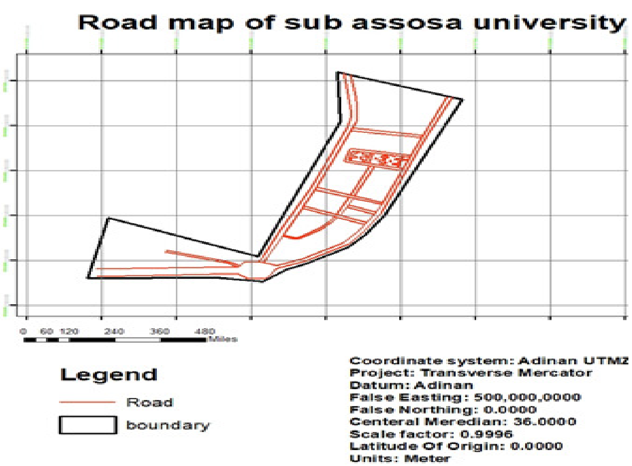


Figure 2Road map

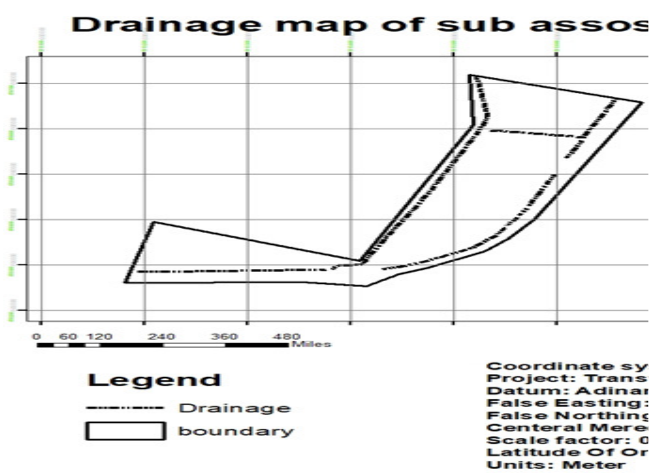


Figure 3drainage map

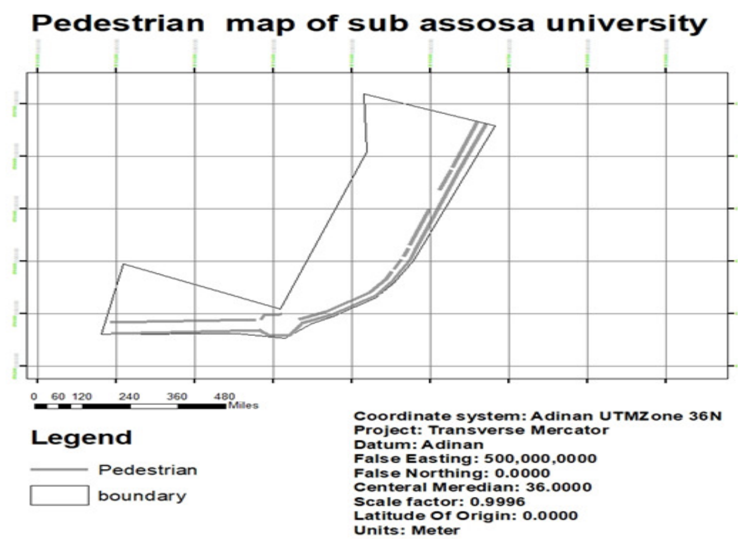
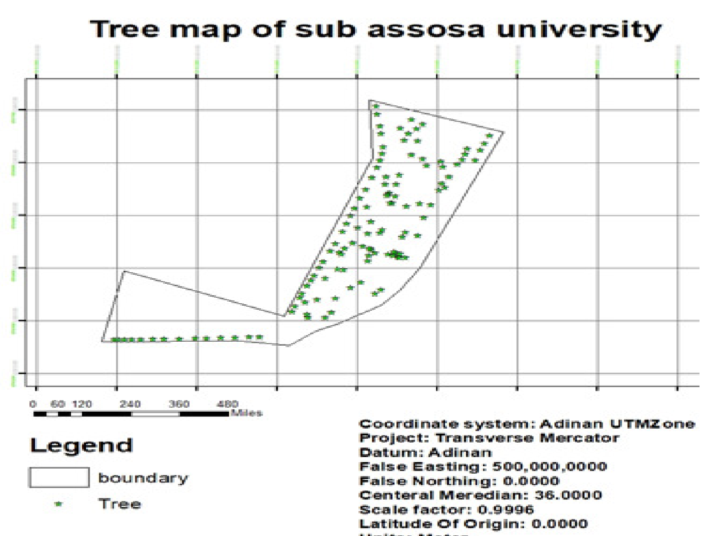


Figure 4 pedestrian map

Point :A zero-dimensional abstraction of an object is represented by a single coordinate. The point features in this area are electric pole and tree. These features are integrated with their respective attributes to be described clearly on the map. There are different types of trees. The existed electric pole and trees are shown in their distinct m



ap below.

Figure 5Tree Map

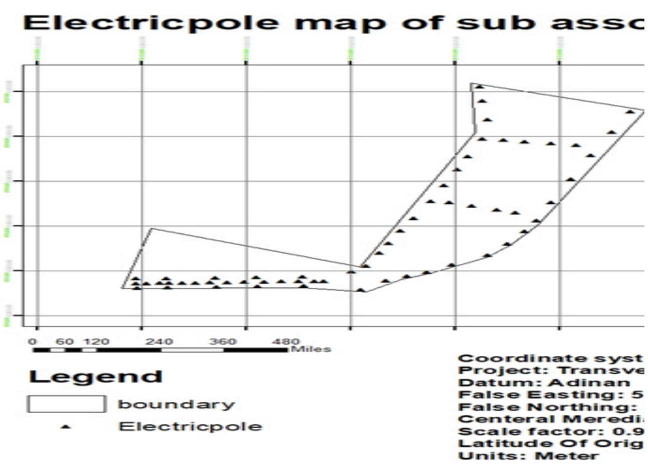


Figure 6Electric Pole Map

4.2.2 Selection in mapping relief features

The amount of relief information that can be shown on a map depends largely upon the scale often map and the contour interval used to portray the relief. If a great amount of relief detail is required, the scale must be enlarged and the contour interval made smaller; but regardless of the scale and contour interval all information concerning the ground surface cannot be shown on maps. The mapmaker must always make a judicious selection of the features that it is desirable to portray.

I. **Choosing a contour interval: -** is the change in elevation between two contour lines. A satisfactory contour interval is one that shows the important topographic features adequately, yet does not result in closely spaced contour lines that are difficult to read. For a given scale and contour Interval, the slope of the ground determines the spacing of contours on the map. Therefore, the most appropriate contour interval is selected according to the scale and the average ground slope in the quadrangle. A topographic map shows the varying shapes, heights and slopes of a landscape using contour lines. That's why they are so useful for bushwalking, property mapping and even town planning. Contour Lines are curves that connect points of equal elevation. Contours are lines that connect points at the same height above sea level and are plotted using vertical aerial photographs (Ramirez, November 2011.)

Contour Characteristics

Contours have general characteristics; some of which are illustrated as following:

- Concentric circles of contour lines indicate a hill.
- Evenly spaced contours indicate uniform slope.
- Widely spaced contours indicate a gentle slope.

II. **Generalization: -** Small irregularities of the ground surface are omitted from the map by drawing the contours as smooth lines through these areas. The technique of ignoring the very small features and drawing the contour lines so that the larger features are emphasized is called generalization.

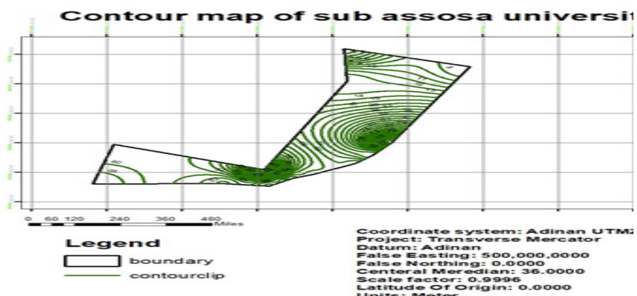


Figure 7 Contour Map

Spatial analysis

The process of examining the locations, attributes, and relationships of features in spatial data through overlay and other analytical techniques in order to address a question or gain useful knowledge. Spatial analysis extracts or creates new information from spatial data.

Triangular Irregular Network (TIN) Triangulations are a form of vector based digital geographic data and are constructed by triangulating a set of vertices points. A vector data structure that partitions geographic space into contiguous, no overlapping triangles. TIN is a more robust way of storing the spatially varying information. It uses irregular sampling points connected through non-overlapping triangles. The vertices of the triangles match with the surface elevation of the sampling point and the triangles (facets) represent the planes connecting the points.

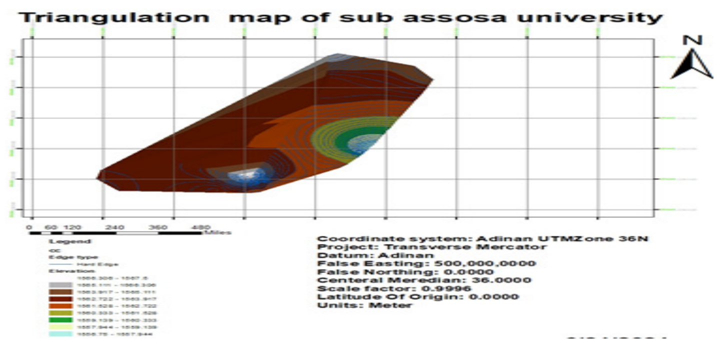


Figure 8Triangulation Map

Slope

Identify the slope (gradient or rate of maximum change in elevation or Z value from each cell of raster surface. Slope is steepness of a surface. Slope can be measured in degrees from horizontal (0–90), or percent slope (which is the rise divided by the run, multiplied by 100). A slope of 45 degrees equals 100 percent slope. As slope angle approaches vertical (90 degrees), the percent slope approaches infinity. The slope of a TIN face is the steepest downhill slope of a plane defined by the face.

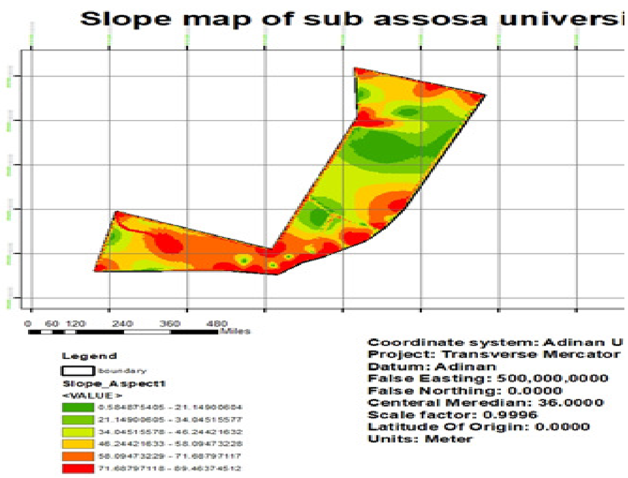


Figure 9 Slope Map

Aspect

The aspect identifies the downslope direction of the maximum rate of change in value from each cell to its neighbors. Aspect can be thought as slope direction. The value of output raster will be the compass direction of the aspect. For example, the aspect recorded for a TIN face is the steepest down slope direction of the face, and the aspect of a cell in a raster is the steepest down slope direction of a plane defined by the cell. The aspect of sub Assosa University indicate that the slope falls in multi direction as shown in

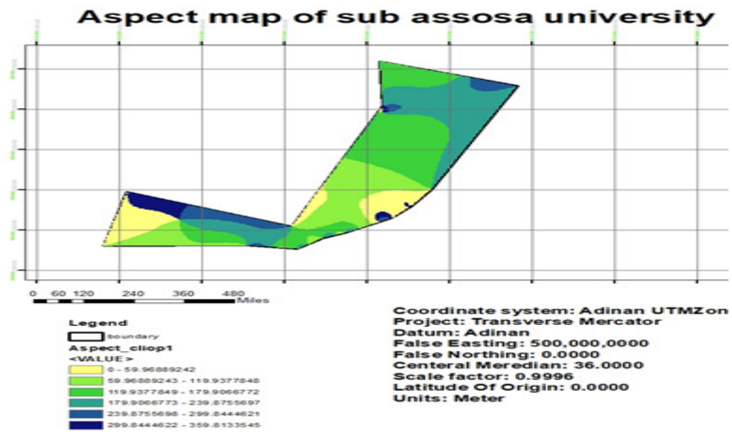


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Figure 10 Aspect Map

The Final Map (Topographic Map of sub-ASU)

The figure below is the final output of the project which is the topographic map of Assosa University. The collected data by using different software by considering all the map design element discussed above the prepared topographic map sub of ASU as follows:

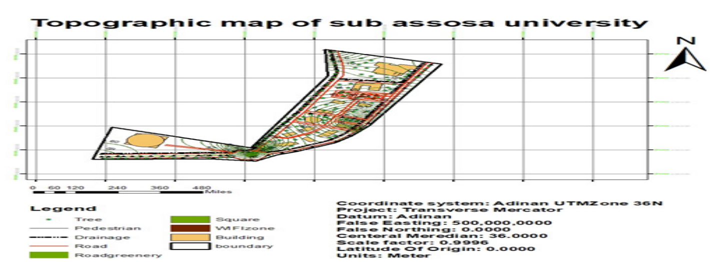

Figure 11 Topographic Map

I. WEBSITE.

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Your paper must use a page size corresponding to A4 whichis 210mm (8.27") wide and 297mm (11.69") long. The marginsmust be set as follows:

- Top = 19mm (0.75")
- Bottom = 43mm (1.69")
- Left = Right = 14.32mm (0.56")

Your paper must be in two column format with a space of 4.22mm (0.17") between columns.

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All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

B. Text Font of Entire Document

The entire document should be in Times New Roman or Times font. Type 3 fonts must not be used. Other font types may be used if needed for special purposes.

Recommended font sizes are shown in Table 1.

C. Title and Author Details

Title must be in 24 pt Regular font. Author name must be in 11 pt Regular font. Author affiliation must be in 10 pt Italic. Email address must be in 9 pt Courier Regular font.

TABLE I
FONT SIZES FOR PAPERS

Font Size	**Appearance (in Time New Roman or Times)**		
	Regular	**Bold**	**Italic**
8	table caption (in Small Caps), figure caption, reference item		reference item (partial)
9	author email address (in Courier), cell in a table	abstract body	abstract heading (also in Bold)
10	level-1 heading (in Small Caps), paragraph		level-2 heading, level-3 heading, author affiliation
11	author name		
24	title		

All title and author details must be in single-column format and must be centered.

Every word in a title must be capitalized except for short minor words such as “a”, “an”, “and”, “as”, “at”, “by”, “for”, “from”, “if”, “in”, “into”, “on”, “or”, “of”, “the”, “to”, “with”.

Author details must not showany professional title (e.g. Managing Director), any academic title (e.g. Dr.) orany membership of any professional organization (e.g. Senior Member IEEE).

To avoid confusion, the family name must be written as the last part of each author name (e.g. John A.K. Smith).

Each affiliation must include, at the very least, the name of the company and the name of the country where the author is based (e.g. Causal Productions Pty Ltd, Australia).

Email address is compulsory for the corresponding author.

D. Section Headings

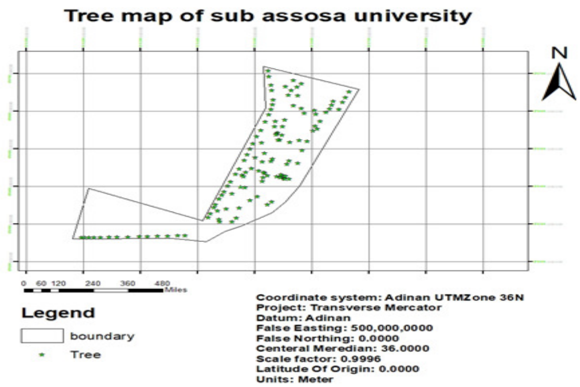
No more than 3 levels of headings should be used.All headings must be in 10pt font.Every word in a heading must be capitalized except for short minor words as listed in Section III-B.

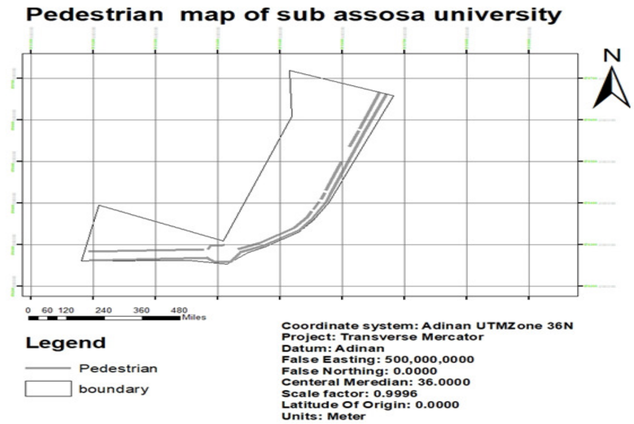
1) ***Level-1 Heading:***A level-1 heading must be in Small Caps, centered and numbered using uppercase Roman numerals. For example, see heading “III. Page Style” of this document. The two level-1 headings which must not be numbered are “Acknowledgment” and “References”.

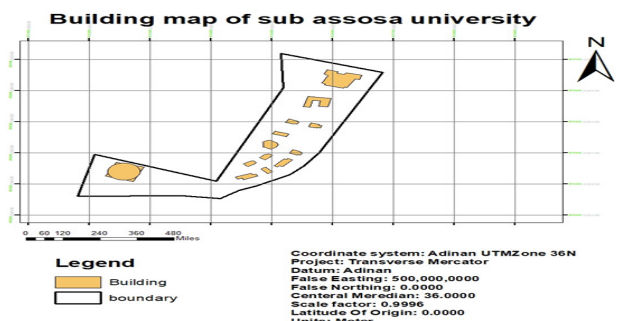
2) ***Level-2 Heading:***A level-2 heading must be in Italic, left-justified and numbered using an uppercase alphabetic letter followed by a period. For example, see heading “C. Section Headings” above.

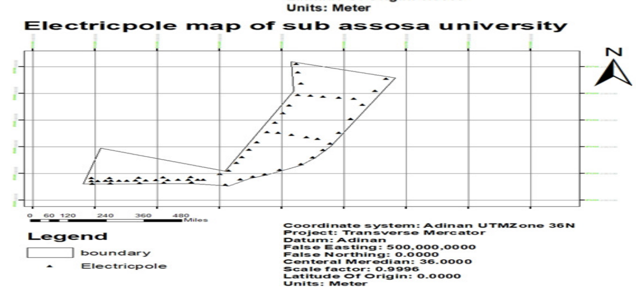
3) ***Level-3 Heading:***A level-3 heading must be indented, in Italicand numbered with an Arabic numeral followed by a right parenthesis. The level-3 heading must end with a colon. The body of the level-3 section immediately follows the level-3 heading in the same paragraph. For example, this paragraph begins with a level-3 heading.

E. Figures and Tables









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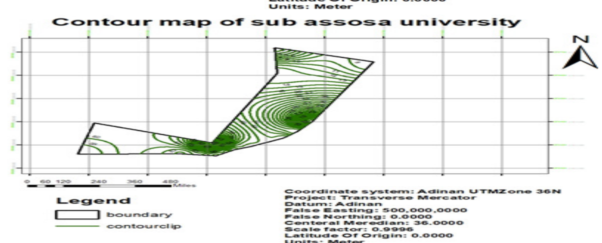
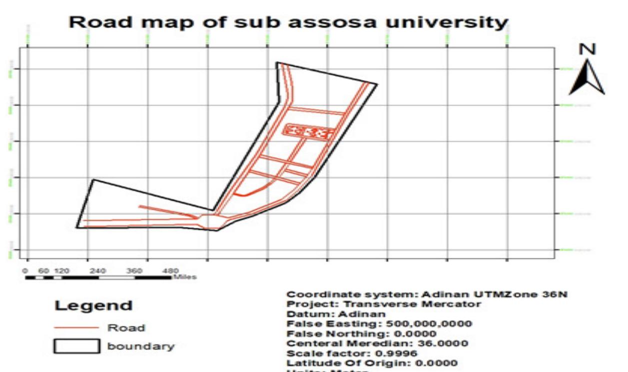
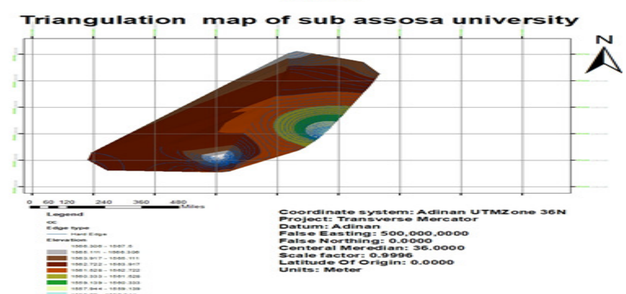
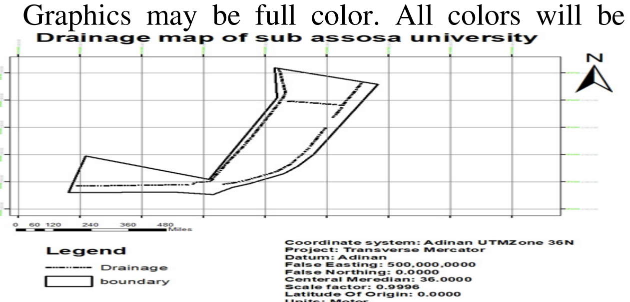
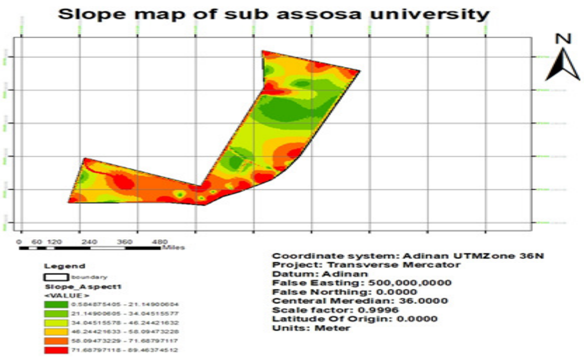






Graphics may be full color. All colors will be





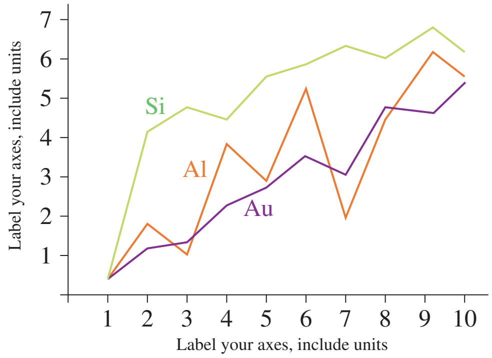
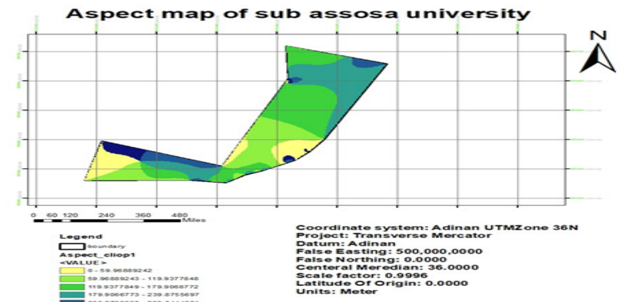


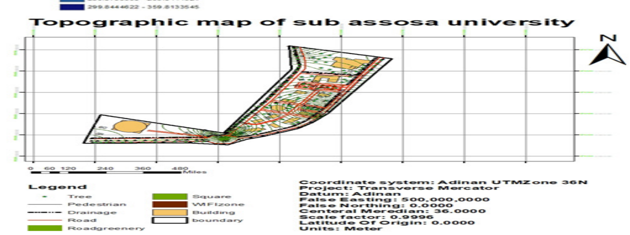
Fig. 1 A sample line graph using colors which contrast well both on screen and on a black-and-white hardcopy

Fig. 2 shows an example of a low-resolution image which would not be acceptable, whereas Fig. 3 shows an example of an image with adequate resolution. Check that the resolution is adequate to reveal the important detail in the figure.

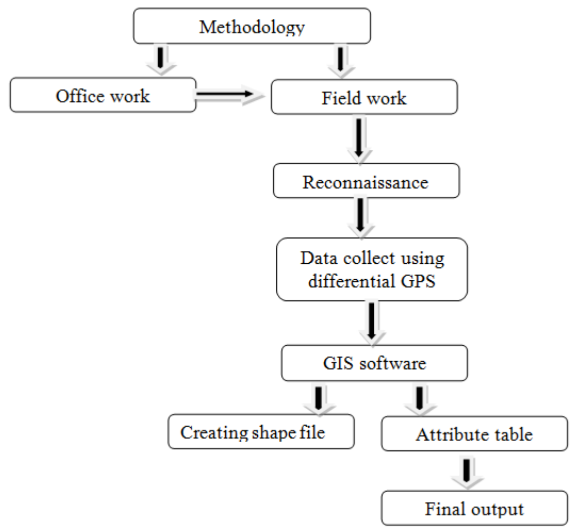
Please check all figures in your paper both on screen and on a black-and-white hardcopy. When you check your paper on a black-and-white hardcopy, please ensure that:

- the colors used in each figure contrast well,
- the image used in each figure is clear,



- 

All text labels in each figure are legible.



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F. Figure Captions

Figures must be numbered using Arabic numerals. Figure captions must be in 8 pt Regular font. Captions of a single line (e.g. Fig. 2) must be centered whereas multi-line captions must be justified (e.g. Fig. 1). Captions with figure numbers must be placed after their associated figures, as shown inFig. 1.

Fig. 2Example of an unacceptable low-resolution image

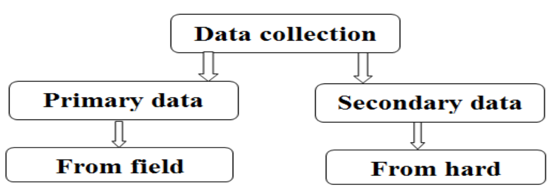

Fig.3Example of an image with acceptable resolution

G. Table Captions

Tables must be numbered using uppercase Roman numerals. Table captions must be centred and in 8 pt Regular font with Small Caps. Every word in a table caption must be capitalized except for short minor words as listed in Section III-B. Captions with table numbers must be placed before their associated tables, as shown in Table 1.

H. Page Numbers, Headers and Footers

Page numbers, headers and footers must not be used.

I. Links and Bookmarks

All hypertext links and section bookmarks will be removed from papers during the processing of papers for publication. If you need to refer to an Internet email address or URL in your paper, you must type out the address or URL fully in Regular font.References

The heading of the References section must not be numbered. All reference items must be in 8 pt font. Please use Regular and Italic styles to distinguish different fields as shown in the References section.Number the reference items consecutively in square brackets (e.g. [1]).

When referring to a reference item, please simply use the reference number, as in [2]. Do not use "Ref. [3]" or "Reference [3]" except at the beginning of a sentence, e.g. "Reference [3] shows …". Multiple references are each numbered with separate brackets (e.g. [2], [3], [4]–[6]).

Examples of reference items of different categories shown in the References section include:

- example of a book in [1]
- example of a book in a series in [2]
- example of a journal article in [3]
- example of a conference paper in [4]
- example of a patent in [5]
- example of a website in [6]
- example of a web page in [7]
- example of a databook as a manual in [8]
- example of a datasheet in [9]
- example of a master's thesis in [10]
- example of a technical report in [11]
- example of a standard in [12]

IV. CONCLUSIONS

A topographic map is a detailed and accurate illustration of manmade and natural features on the ground such as roads, railways, power transmission lines, contours, elevations, rivers, lakes and geographical names.

Now a day's the topographic map is very essential in a diverse field of work, which are very common in the day-to-day activity of human beings such as design of road, study of the contour interval, and to know building construction area.

Topographic map of sub Assosa University is including different features (objects) that can be found in nature and artificial (manmade). This project or the gained map uses for the following purposes; As the attempt is to exercise or explore skill in making a map it has a great role on behaves of up grading potential to produce a map (topographic map).

The preparing of topographic map is the detail work because the feature that can be found in that area is representing in their symbol to describe full information about the feature. So, topographic map is used for the university to study the slopes, elevation, maximum contour interval, minimum contour interval, the location of infrastructure and different types of construction.Causal Productions permits the distribution and revision of these templates on the condition that Causal Productions is credited in the revised template as follows: "original version of this template was provided by courtesy of Causal Productions (www.causalproductions.com)".

ACKNOWLEDGMENT

First of all, would like to give our heartfelt gratitude to Department of Surveying Engineering for providing us this project that would ultimately broaden our knowledge of preparation topographic map and also for most we would like to express our deep sense of gratitude and appreciation to our project advisor, Mr. TAMIRU to his effort that help us for guiding us throughout this project. Finally, we would like to thanks all of the group members for their dedicative efforts and for their collaboration to bring this project this far.

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