PROJECT REPORT

ON

ROUTEY SURVEY

OF

OKE-OSE- SENTU ROAD, OFF OLD JEBBA ROAD, ILORIN EAST LOCAL GOVERNMENT AREA, KWARA STATE.

BY

AZEEZ FARUQ AYOMIDE

MATRIC NO.: ND/23/SGI/FT/0060

BEING A PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF SURVEYING AND GEO-INFORMATICS, INSTITUTE OF ENVIRONMENTAL STUDIES.

IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF ORDINARY NATIONAL DIPLOMA (OND) IN SURVEYING AND GEOINFORMATICS, KWARA STATE POLYTECHNIC, ILORIN.

JUNE, 2025

CERTIFICATE

I hereby certify that all the field work and information combined in this project write up were obtained as a result of observation and measurements made by me **AZEEZ FARUQ AYOMIDE** with matriculation number **ND/23/SGI/FT/0060** and that the survey was carried out in accordance with survey rules and regulations and departmental instructions.

…….. ……

AZEEZ FARUQ AYOMIDE **DATE**

ND/23/SGI/FT/0060

CERTIFICATION

This is to certify that **AZEEZ FARUQ AYOMIDE** with matriculation number **ND/23/SGI/FT/0060** has successfully carried out the survey duties contained

_____ .....
Surv. Abdulsalam Ayuba Sign and Date
Project supervisor

_____ .....
Surv. B. Y. Oguntayo Sign and Date
Project supervisor

_____ .....
Surv. S. A. Awoleye Sign and Date
Project Coordinator

_____ .....
Surv. I. I. Abimbola Sign and Date
Head of Department

_____ .....
External Examiner Sign and Date

DEDICATION

This project is dedicated to the Almighty God for his mercy and for loving guidance **MR and MRS AZEEZ** who saw me through the pregame.

ACKNOWLEDGEMENT

All glory honor adoration to God Almighty, the gracious one who has given me the opportunity complete my ND programmed. My appreciation goes to my project supervisors in the person of Surv. Abdulsalam Ayuba and Suvr. Benard Oguntayo for their strictly and through supervision. I will like to thank all lecturers of this noble department starting from H.O.D Surv. Abinbola isau, Surv. A. Ayuba, Mr. Bello Felix Diran, Surv. Williams Kzeem, Surv. A.O. Akinyede, and also the Director of special duty in IES Surv. A.G. Aremu and other supportive staff of the department of Surveying and Geo-informatics,

I also express my sincere gratitude to my wonderful parents **Mr. and Mrs. AZEEZ** for their financial morals support toward the competition of this program. You will reap the fruit of your labour (Amen).

ABSTRACT

This project report contains the reconnaissance, field work, data processing exercise, and every other procedure undertaken in the course of this project which focused on Route Survey which involves acquisition of data for the purpose of road construction design for the road from GT junction to SENTU Road in Oke- Ose Ilorin East local government of Ilorin, Kwara State. The field work involved, reconnaissance, distance measurement with DGPS and, the numbers of intersection point (I.P), benchmark (B.M), using COR STATION The acquired data were processed using appropriate formulae. The plans were produced from the processed data at suitable scales both in digital and graphic formats. Finally, a project report was written.

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CHAPTER ONE

1.0 INTRODUCTION

World all over, Surveying has been recognized as the groundbreaking operation for every environmental, infrastructural and meaningful development. It has developed over years to pave ways for maintenance and sustenance of geophysical landmarks by ways or virtues of detecting and forestalling disasters and asserting the tiny line (boundary) whose inconspicuousness can beget feud and animosity between individuals, communities, towns, nations and continents. While it is mostly considered as a pure environmental science or engineering discipline, its social organization and engineering is unarguably great.

Route survey is type of engineering surveying, which provides height along a proposed route with offsets at the both sides of the centerline of the route. This serves the purpose of location, design and construction of the route networks. Route survey, therefore, can be explained as a survey made along a line or narrow belt or strip for location, design, and construction of any route of transportation such as highways, railways sewage and oil. It is also very useful in surveys which require the establishment of both vertical and horizontal alignment for cross-country development of utilities.

Route survey is a survey for the design and construction of linear works, such as roads and pipelines, is the way of collecting data about a proposed new

route for a road utility pipe, railway, rapid transits guide ways, canal, meanwhile surveying comprises of all surveying/survey operation required for the design and construction of engineering works such as traversing of the road, profit, leveling and cross sectional leveling.

In construction of highways, route survey works are required for the development of the project estimation of cost. Route surveying collect data about proposed new route for road, utility pipe and railway transmit guide, canal and transmission line, route surveying pertains to the laying out of the proposed corridor for transportation system. A survey of the earth's surface along a particular route in the compilation and updating of topographical, geological, soil and other maps and the correlation of selected contours and objects with geodetic reference points or landmarks during linear surveys, and also in the study of the dynamics of natural and socioeconomically phenomena in a narrow strip of terrain. In route survey, representation of the plane horizontal features (including the terrain if necessary) on both sides of it within the limits of directs visibility are plotted on a map board using method of instrument surveying.

To carry out a good economic and easy maintenance of construction. Investigation and planning Designing Construction In order to carryout route survey successfully the survey engineer must be familiar with the geometry of horizontal and vertical curve how they are used in the route. Making measurement necessary to verify the location of the structure. How to determine

the volume of work actually performed up to a given level. Route survey it involve in measuring and computing horizontal and vertical angles, elevation and horizontal distance the results of these surveys are used prepare detailed plan and profile base maps of proposed road ways. It the elevations determined in the survey serve as the basic for calculation of construction cut and fill quantities and in determining roadway banking. This section presents a review of basic terminology. Concepts and standard procedures used in high way surveys. The principle of mobility is of immense global concern to human and plant in such a way that the objective of mobility is achieved in most conducive manner. It is an idea that has a natural influence on activity of both plants and man that its effect has direct impact on life plant extend their root in search of nutrients and support, this is a form of mobility. Any obstruction in the course may result to life termination. This may invariably have an adverse effect on the environment. This project is basically on route surveying. Route survey is a process in surveying that can be applied to establishment of horizontal and vertical alignment for transportation facilities these include: high ways, canals, pipelines, transmission lines and rapid transit. A Route Survey is defined as being the required service and product that adequately locates the planned path of a linear project or right of way which crosses a prescribed area of real estate, extending from at least one known point and turning or terminating at another known point. Adequate location shall mean substantial compliance with the conditions and tolerances expressed in this standard.

A route survey which defines new or proposed boundaries shall be conducted as a boundary survey and must adhere to the rules and regulations. A Route Survey is usually required for the planning of a right of way, the acquisition of fee or easement property and for eventual construction layout work. The locations of the facilities within the right of way are often held in respect to the center line or a right of way line. A Route Survey is made on the ground to provide for the location of right of way lines, a centerline, or reference lines in relation to property lines and terrain features. Route Surveys shall include but are not limited to the proper location, Monumentation, description or platting of the following routes: Transmission lines for communications, fuel, chemical, water and electrical needs. Canals, waterways, drainage ditches and sewers. View easements, air space easements, and ingress and egress easements such as approach routes.

1.1. AIM OF THE PROJECT

The aim of the project is to provide the cross section information of the route which will serve as the information to be used for re-designing of the road and computing for the volume of the land

1.2. OBJECTIVE OF THE PROJECT

In order to actualize the above mentioned aims, the following objectives listed below were to be done;

i. Horizontal Alignment

ii. Vertical Alignment

1.3. SCOPE OF THE PROJECT

i. Reconnaissance survey (initial exploration)

ii. Preliminary survey (Data collection)

iii. Detailed survey (precise measurements)

iv. Re designing and planning for construction

v. Report writing.

1.4 PERSONNEL

The personnel involved in the survey are;

NAME	MATRICNUMBER	ROLE
ALADE FLORENCE ABOSEDE	**ND/23/SGI/FT/0071**	**GROUPLEADER**
AWOSENL BOLUWATIFE .O	**ND/23/SGI/FT/0072**	**MEMBER**
KAZEEM FARIDAH ENIOLA	**ND/23/SGI/FT/0069**	**MEMBER**
MURITALA MUJIDAH .K	**ND/23/SGI/FT/0068**	**MEMBER**
BADMUS FATHIA ARIKE	**ND/23/SGI/FT/0070**	**MEMBER**
AZEEZ FARUQ AOMIDE	**ND/23/SGI/FT/0060**	**MEMBER**
OLAREWAJU BOLUWATIFE .A	**ND/23/SGI/FT/0067**	**MEMBER**

1.5 LOCATION OF THE SITE

The study area is at Sentu – Oke-Ose Road, off Old Jebba road, Ilorin East Local Government Area Kwara State. The length of this project is 5km covered the Latitude (8º32’54.40”) N Longitude (4º39’10.90”)E and Latitude (8º30’52.57”)N Longitude (4º40’55.30”)E.

1.5.1 MAP OF THE STUDY AREA

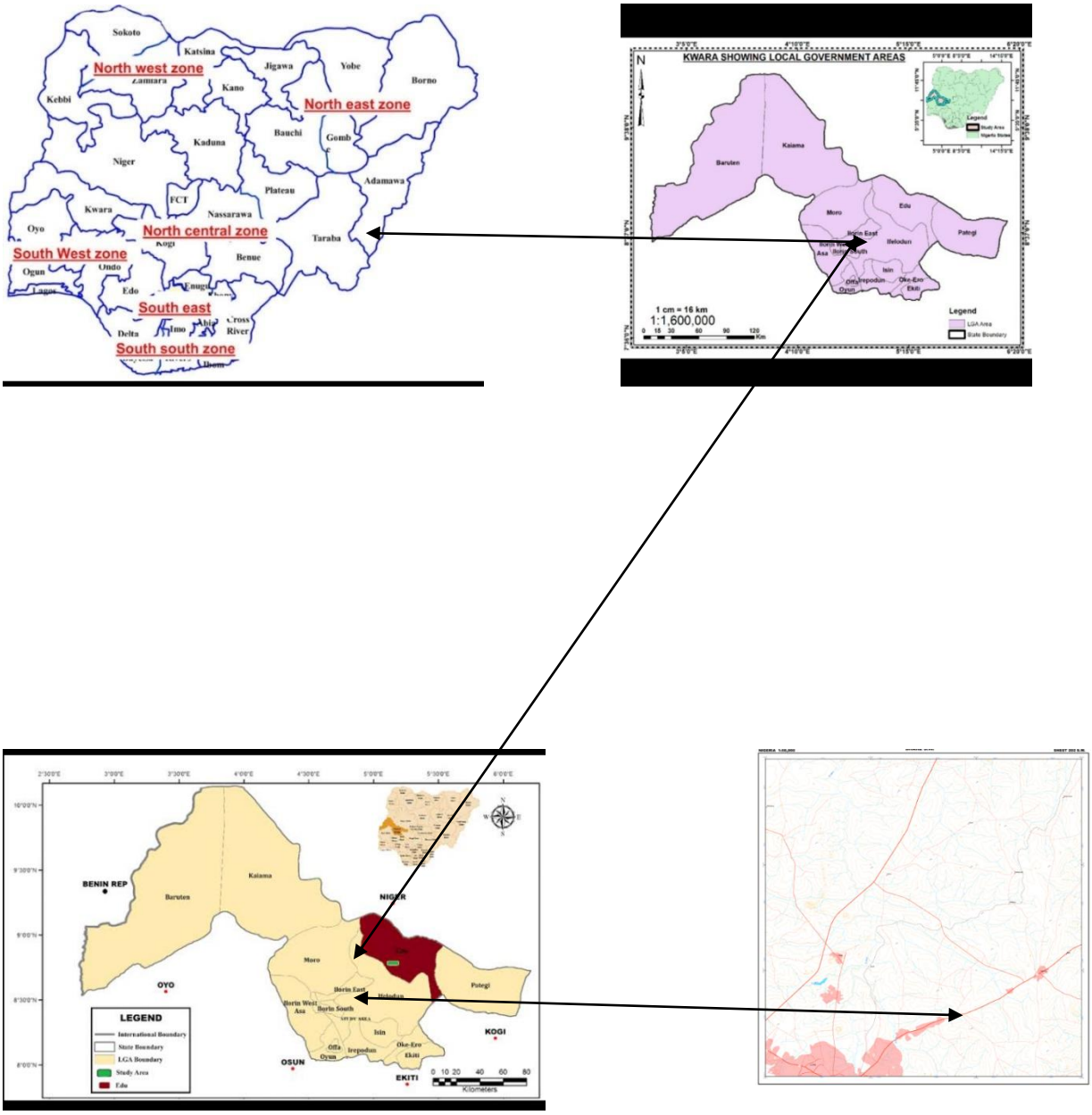

FIG.1.5.1Showing Nigeria map, Kwara state map, and topographical map covering the project area

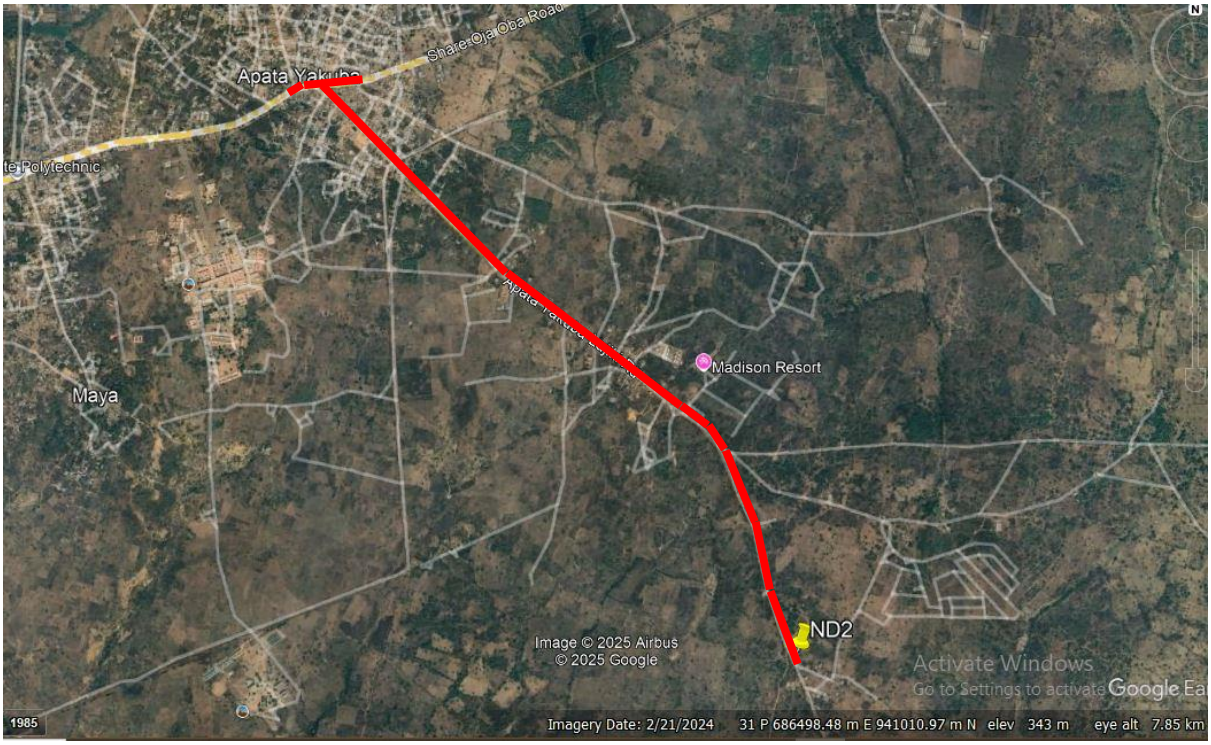

Fig. 1.5.1 showing the imagery covering the project area

CHAPTER TWO

2.0. LITERATURE AND REVIEW

The Evolution of Route Surveys: From Traditional Methods to Modern Technologies Route surveys have undergone significant transformations over the years, driven by advancements in technology and changing project requirements. Traditionally, route surveys relied on manual techniques such as theodolite and leveling, which were time-consuming and often prone to errors. The applications of route surveys are diverse, ranging from transportation infrastructure to utilities and pipelines. Route surveys play a vital role in ensuring the efficient, safe, and cost-effective development of these projects. As the field continues to evolve, emerging technologies like artificial intelligence and machine learning are expected to further enhance the efficiency and accuracy of route surveys. Moreover, sustainability and environmental considerations will become increasingly important, with route surveys needing to balance development needs with environmental concerns.

Land surveying can include associated service such as mapping and related data accumulation, construction, layout surveys, precision measurement of length, angle, elevation, area and volume as well as horizontal and vertical control surveys, and the analysis and utilization of land survey data. According to oxford dictionary, surveying is defined as the collection and measuring of all

facts needed for determining the boundaries, size, shape, position, contours, ownership and value etc. of a country coast, district and estate.

Also, Encarta Encyclopedia (2005) defined surveying as the mathematical science used to determine and delineate the form, extent and position of feature on or beneath the earth surface or control purposes that is aligning land and construction boundaries and for providing check for construction boundaries. Oxford advance learner`s Dictionary further described surveying as an act of examining and recording the measurement of an area of land in order to produce map or plan of the area.

Brinker [1997] define surveying in more general sense as that discipline which encompasses all methods for gathering and processing information about the physical earth and environment. He defined surveying as the science and art of making measurements of relative position of the natural and artificial features on the surface of the earth and the plotting of these measurements to some suitable scale to form plan or map. In all surveying operation relating to the surface of the earth and geographical features, surveying is the core or foundation of that operation and it is mostly embraced, surveying can therefore be referred to as the bedrock of all physical development. Surveying is also defined as the art of measuring horizontal and vertical distances between objects, measuring angles between lines, determining the direction of lines and

establishing point by predetermining angular and linear measurements He also categorized the work of a surveyor as follows;

i. Decision Making: this is the knowing of the purpose of survey, deciding on the survey method, equipment, scale to be used in a job and the costing.

ii. Field Work and Data Acquisition: this involves making necessary measurement and recording the data on the field.

iii. Data Processing: this involves calculation of the recorded data from the field to determine the location, area, volumes and so on.

iv. Mapping/ Information Presentation: this involves plotting of the measurements (Processed data) with a suitable scale to produce a map, plan, or chart on even portraying the data in numerical or computer format.

v. Stake Out: this involves setting out monument and stakes to delineate boundaries or guides for construction operations.

Surveying is one of the oldest and most practicable professions by man because from the earliest time it has been discovered necessary to mark boundaries and divide land. Surveying has been used to map the earth above and below the sea levels, prepare navigation charts used in the air and on water, establish property boundaries of private and public lands etc. It is also used to

develop databanks of land use and natural resources information which aid in managing our environment , railways, rapid transit system, building, bridges, missiles ranges, landing site curve designing, tunnels, canals, irrigation ditches, dams, drainage works, urban and subdivision, water supply and sewage system etc.

Basak (2000) remarked that the principle of Route surveying requires that the route should be chosen in such a way that the project may be constructed and operated with the aim of attaining greater economics buoyant and that is why a comprehensive route surveying consists of the following sequence of survey;

i. Reconnaissance survey; this is a very rapid but thorough examination of an area or strip of territory between the terminal of the project to determine which of the several possible routes may be worthy of a detailed survey. This is done with the use of available existing plans and maps, aerial photographs and satellite imagery of the area of interest. It is the most important aspect of surveying.

ii. Preliminary survey; it is a detailed surveying of territory through which the purposed line is expected to run. It is made of the best of the several lines directions investigated previously on the reconnaissance survey. The purpose is to prepare an accurate topographical map of the belt of country

along the selected route and this arrives at a fairly close estimate of the cost of the line surveyed.

iii. Location survey; this is the ground location of the proposed line marked on the map. The main purpose of location survey is to make minor improvement on the line as may appear desirable on the ground and to fix up the final grades. The lines are finally located on ground and this is called the field location.

iv. Construction survey; the purpose of this survey is to re - establish points, lines and grades on the ground during construction. It is also consist of stake out various details, culverts and bridges and in carrying out such other survey as may be needed for the purpose of construction.

Basak (1994) wrote that when a situation for constructing a new road arises due to public demand or some strategic reasons, the procedures to be taken are:

i. To find the necessity for the existence of road.

ii. The marking of tentative alignment. The reconnaissance survey (recce).

iii. The preliminary location survey.

iv. The final location.

v. The report.

Further, he emphasized that the tentative alignment are marked on the general map and contour map of the area through the area is expected to pass, a reconnaissance is to select the most suitable alignment. Finally route survey involves the determination of ground configuration and location of the physical features both natural and artificial along the proposed route establishing the line on the ground & computing volumes of earthwork involved where applicable. This kind of survey operation is very important on all road network and construction of new road in order to increase the durability and carrying capacity of the road network.

Local planning handbook (2015) said routes that follow simple pattems with few turns are easier to understand for transit riders. A network of simple routes makes the whole system easier to use spontaneously with little planning. Routes that do not make a lot of deviations also provide a faster trip for riders and are less expensive to operate for the provider meaning more service can be provided for the same resources. Communities can support this principle by encouraging development along denser, linear corridors and connecting gaps in the street grid to allow transit to have simple and direct routes in their communities. Basak N N (2010), defined surveying as the art and science of determining the relative position of various points or stations on the surface of the earth by measuring the horizontal and vertical distances, angles and taking

the details of these point and by preparing a map or plan to any suitable scale. Route survey is type of engineering surveying, which provides height along a proposed route with offsets at the both sides of the centerline of the route. This serves the purpose of location, design and construction of the route networks. Route survey. Therefore, can be explained as a survey made along a line or narrow belt or strip for location, design, and construction of any route of transportation such as highways. Railways sewage and oil; It is also very useful in surveys which require the establishment of both vertical and horizontal alignment for cross-country development of utilities. Apart from the general scope of surveying which include: Planning and Decision making: That is, knowing the purpose of survey, deciding on survey methods, equipment scale, costing etc. Data acquisition or Field work: This involves actual making of measurement and recording of data in the field.

Engineering survey had assumed the goal of dimensioning the physical environment. Greater part of its responsibility is seen from the various types of surveying which are geared towards promoting accessibility, touted convenience, economy and spatial delineation of both natural and social government He also stated that engineers and surveyors involves in site, surveying are response for all aspect of dimensional control on such schemes. According to him, the purposes of engineering surveying are to provide large scale topographical map plan and other measurement at the concept and design

stage. Since this data forms the basis for an entire project, the reliability of the design depends to a great extent on the precision and thoroughness with which the original site survey is carried out. To provide precise framework at the construction stage control from which it is possible to position the works and, most importantly, to ensure that engineering project are built in their correct relative and absolute position (this is known as setting out). In addition to these, data for the measurement of the work is also collected to enable volumes of the material to be estimated during construction. To monitor structural movement on major retaining structure at the post construction stage. History testifies that transportation is necessary to draw a country, state town or settlement to civilization by making communication among neighbors easier. Various means of transportation exist; they are transportation by air, by land and transportation by water. Land transportations involves by rails, and roads. Road accounts for about 95% of all surface transportation in Nigeria Road make possible socio-economic and cultural relationship among communities and create avenue for the good and management of the environment. Good transportation, in and of itself, will not assure success in the marketplace, as the availability of transportation is a necessary but insufficient condition for economic growth. However, the absence of supportive transportation services will serve to limit or hinder the potential for a nation or region to achieve its economic potential. Thus, if a society expects to develop and grow, it must have a strong internal

transportation system consisting of good roads, rail systems, as well as excellent linkages to the rest of the world by sea and air.

CHAPTER THREE

3.0 METHODOLOGY

This can be termed as a set of methods and principles used to perform a particular activity. For the activities to be successfully performed, proper planning is very important. This involves development of a work plan showing how goals and objectives are to be accomplished. Hence, planning is one of the essential factors for the effective project execution and management. Proper planning was taken for the execution of this project and this involved;

1. The choice of the most appropriate techniques for carry out of the project
2. Selection of equipment used
3. The design of a monitoring scheme that really helped in achieving the required accuracy for the project, starting from reconnaissance to the final product of the project.

3.1 RECONNAISSANCE

This is an important and first aspect in any survey project carried out to obtain the general view of the study area in terms of the nature of the terrain and to adequately plan the best ways to the set aim and objectives of the project. The importance of reconnaissance to any survey work of any size and nature cannot be over-emphasized. Experience has proved that time spent in carrying out a good reconnaissance is not a wasted time since it contributes to the quick

execution of any survey exercise and promotes easy survey work. Reconnaissance simply connotes the summation of all activities preceding the actual execution of a survey job. It involves taking a general study or view of an area of operation with a view of knowing how best the operation is to be carried out in terms of energy and time. As this project was concerned, the reconnaissance was carried out in two stages.

The two stages of reconnaissance are;

i. Office planning
ii. Field planning

3.1.1 OFFICE PLANNING

Office planning is also known as office reconnaissance. It is a vital component of route surveying, enabling surveyors to gather existing data and information before conducting fieldwork. This process involves a thorough review of available resources, including maps, aerial imagery, and existing reports.

3.1.2. FIELD PLANNING

The field reconnaissance was first carried out before the actual operation. This aspect involved site visitation to the project site by all the group members to

have a pre-requisite knowledge of how it looks and how the field operation will be carried out.

During the visit, the control points planned to be used were marked, the reconnaissance facilitated the planning and carrying out of the actual survey as it was taking into consideration, the possible problem that are likely to be encountered, how such problems can be overcome or reduced to the barest minimum.

3.2 FIELD PREPARATION

This involved the operation carried out before the actual observation. The operation involved marking of chainages which is done at 25cm interval.

3.3. MOMENTATION

Temporary bench mark (TBM) were established and coordinated along the entire route of the project, which were meant to serve as controls for establishing Centerline chainage, setting out of curve and other road features during the actual construction.

The position of these beacons were selected in such a way that they are intervisible to each other, not too far from the proposed road and considerable number of Centerline can be set out from them.

The property beacon used were precast with dimensions 18cm square by 75cm in length. 65cm of the precast beacon was buried beneath the surface and 10cm above. This was done in compliance with the specification of cadastral survey regulations as specified in CAP 425 law of the federation of Nigeria. The property beacon was made of concrete mixture of ratio 3:2:1 of sand, granite and cement. The iron rod protruding at the center of the beacon formed the station mark.

The numbering was done serially from the beginning to the end of the proposed road and were prefixed with the identification number KP ND11 001

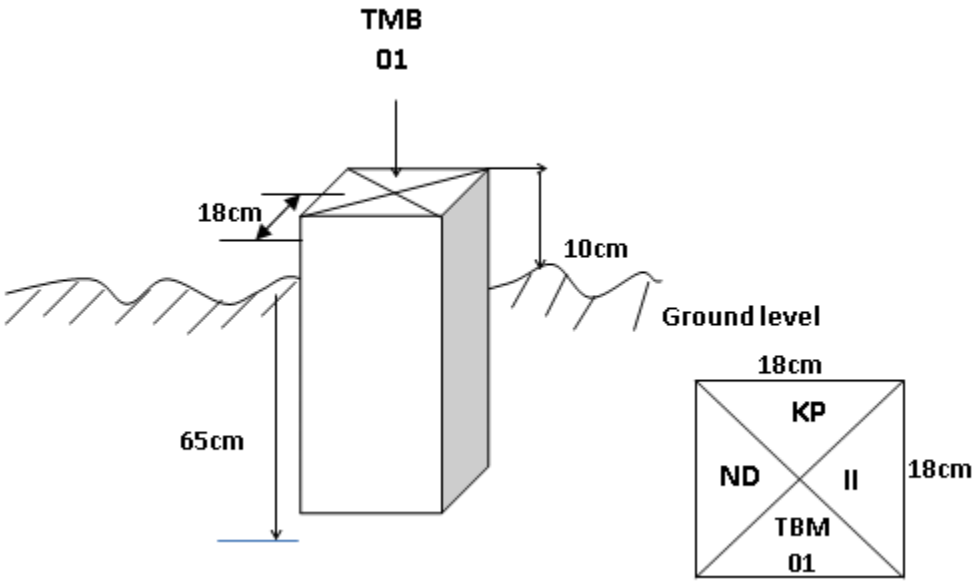

Fig. 3.0 Showing typical survey beacon

3.4. EQUIPMENT USED

3.4.1 HARDWARE USED

i. Differential GPS
ii. Handheld GPS
iii. Linen tape
iv. Power supplies
v. Nails and bottles cork
vi. Hammer
vii. Cabling and connectors

3.4. 11. SOFTWARE USED

i. AutoCAD/ CivilCAD 2014
ii. Microsoft office (word and excel)
iii. Notepad

3.5. METHOD USED

CORS TECHNOLOGY

CORS stands for (Continuously Operating Reference Station). It is a type of GPS or GNSS (Global Navigation Satellite System) station that:

1. Collects and transmits GPS/GNSS data continuously.
2. Provides real-time corrections to improve the accuracy of GPS signals.

CORS are used to enhance the precision and reliability of GPS positioning for various applications, including surveying, mapping, navigation, and more.

How you use a CORS with a data logger when collecting survey data:

How to Use a CORS with a Data Logger

1. Set Up Your GNSS Receiver & Data Logger

- Mount the GNSS antenna securely on your survey pole or tripod.
- Connect your data logger/controller to the GNSS receiver. The data logger is usually a handheld device or tablet used to configure settings and record data.

2. Configure the CORS Connection

- On the data logger, enter the CORS network settings:
- Enter the username
- IP address & port of the CORS provider.
- You'll need mobile internet (, hotspot) on your data logger or receiver to access the CORS network in real time.

3. Select Correction Service Type

- Choose RTK corrections (Real-Time Kinematic) if you want live centimeter-level accuracy.

- Some systems also allow post-processing (PPK), where you log raw data and apply CORS corrections later.

4. Start Receiving Corrections

- Once connected, the GNSS receiver will start applying correction data from the CORS.
- The data logger will show “Fixed RTK” or “Float RTK” status, indicating correction quality.

5. Begin Surveying & Logging Points

- Move to the points you want to survey.
- Use the data logger to record positions, adding descriptions, codes, or attributes as needed.
- Each recorded point will have high-precision coordinates

6. Save & Export Data

- After collecting your points, you can export the data (CSV, DXF, shapefiles, etc.) from the data logger for further use in GIS, CAD, or mapping software.

In Simple Terms:

The CORS sends corrections to your rover via the internet.Your data logger controls the receiver and records corrected point data.

CHAPTER FOUR

4.0 DATA PROCESSING AND RESULT ANALYSIS

This stage involves downloading of the acquired data on field from the digital equipment to the personal computer for further processing. The data obtained were downloaded using a data transfer cable. After successfully downloaded of those data, they were edited using Microsoft Excel and Notepad Software which made it possible to easily import the edited copy into AutoCAD for drafting and designing. The coordinate obtained were in X, Y, Z format which were used for plotting the route's longitudinal profile

4.1. DATA DOWNLO1ADING

1. The instrument was connected to the personal computer via downloading cable, the corresponding software was launched and the instrument port was selected.
2. All the folders on the instrument were displayed. The folder containing the data for the group was then copied and pasted on another folder already created on the local drive of the personal computer.
3. The folder was launched and the file containing the data was opened with notepad application.

4. The results were in the format; Point ID, Easting, Northings and Height. The downloaded data were edited in Notepad, Microsoft Excel and scripts were prepared in Notepad in order to be plotted in AutoCAD.

4.2 DATA PROCESSING

Data processing is a critical component of route surveys, enabling the transformation of raw data into usable information for design, analysis, and decision-making. Route surveys involve collecting vast amounts of data, including topographic information, environmental factors, and infrastructure details.

The data processing stage involves several key steps, including data cleaning, transformation, analysis, and visualization. Data cleaning removes errors, inconsistencies, and outliers, ensuring the accuracy and reliability of the data. Data transformation converts the data into suitable formats, while data analysis applies algorithm

The downloaded data from the equipment was further edited using Microsoft Excel and Notepad, the final edited copy was saved as text file containing X, Y, Z coordinates of all points observed in the field.

4.3 RESULT ANALYSIS

The results were analyzed so as to check the accuracy of the job by comparing the result obtained with the minimum allowable error acceptable for this order of survey job in accordance with survey rules and departmental instructions.

4.3.1 LONGITUDINAL /HORIZONTAL ALIGNMENT PROFILE

1. In CivilCAD environment, Road menu was clicked and HORIZONTAL ALIGNMENT chosen
2. Options button was clicked in the appeared dialogue box and Define section was then clicked to choose the section format and the distance between the sections. Format 2 was chosen and the distance between sections was taken to be 25m.
3. Having chosen these options, OK was clicked twice.
4. Pick tool was selected from the right pane dialogue box to pick the intersection points (IP), and appropriate radius values of curve was given to each IP as specified by the client.
5. Apply button was then clicked to effect all the given parameters on the drawing. On each IP position, information about the IP is been displayed.

Such information are; IP number ,X coordinate, Y coordinate, Radius of Curve, Length of curve, Deflection angle and so on.

4.4 INFORMATION PRESENTATION/ PLAN PRODUCTION

The data acquired were processed into plan for visual presentation with AutoCAD CivilCAD. The visual display graphical information in AutoCAD was printed as hardcopy of the plan. The longitudinal section and profile were plotted.

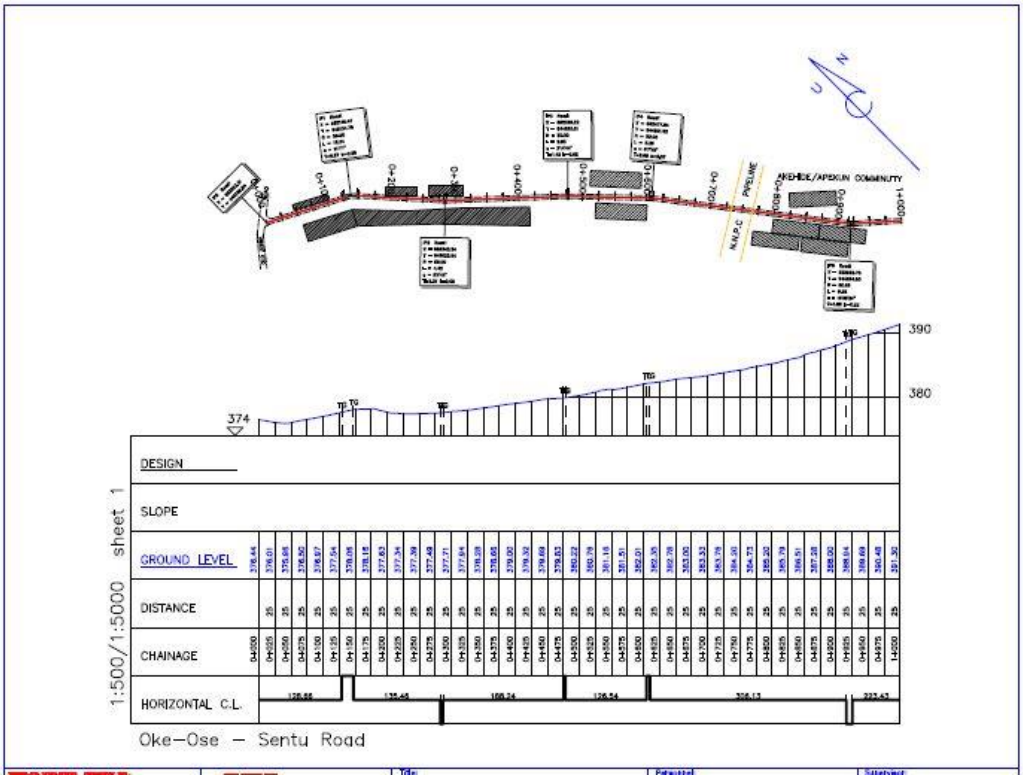

Fig. 4.0 showing the Profile and Longitudinal Section from Chainage 0+000 – 1+000

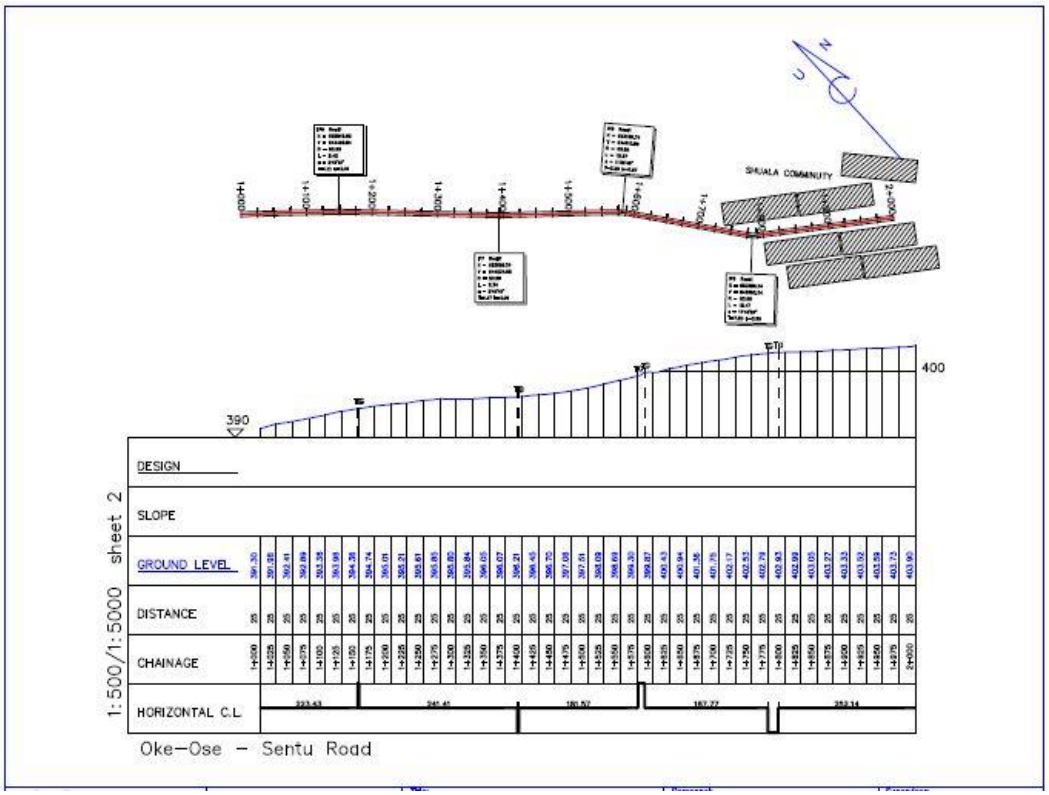

Fig. 4.1 showing the Profile and Longitudinal Section from Chainage 1+000 – 2+000

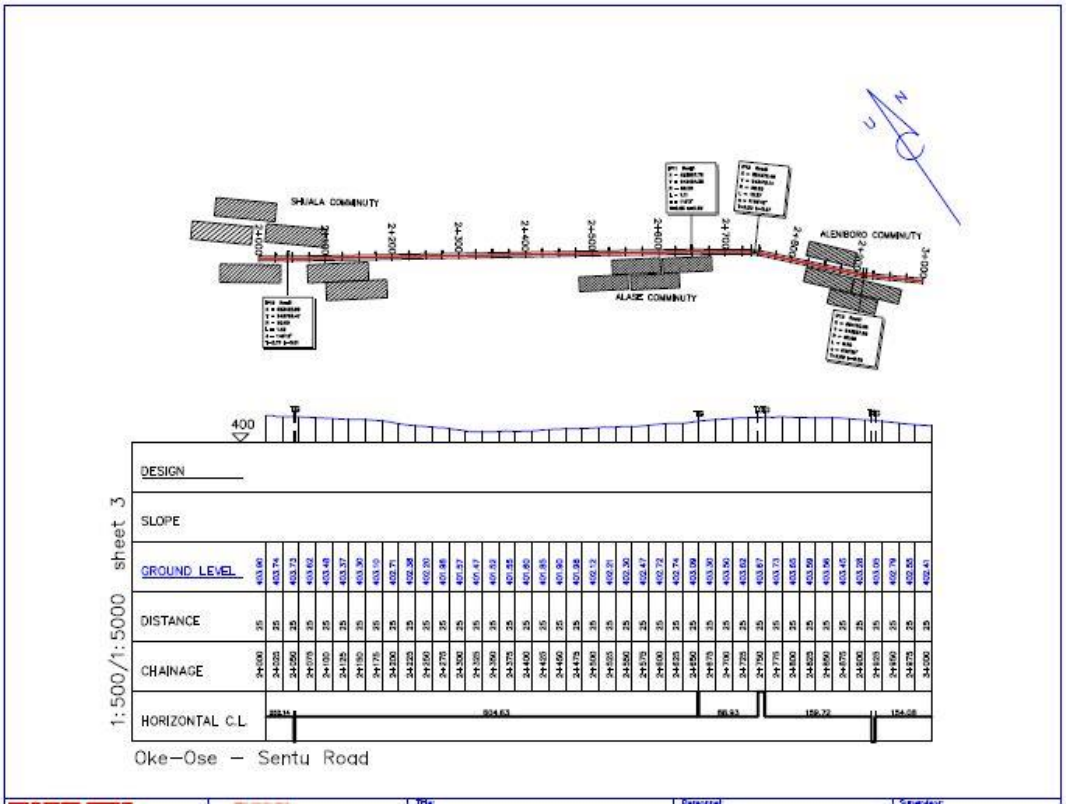

Fig. 4.2 showing the Profile and Longitudinal Section from Chainage 2+000 – 3+000

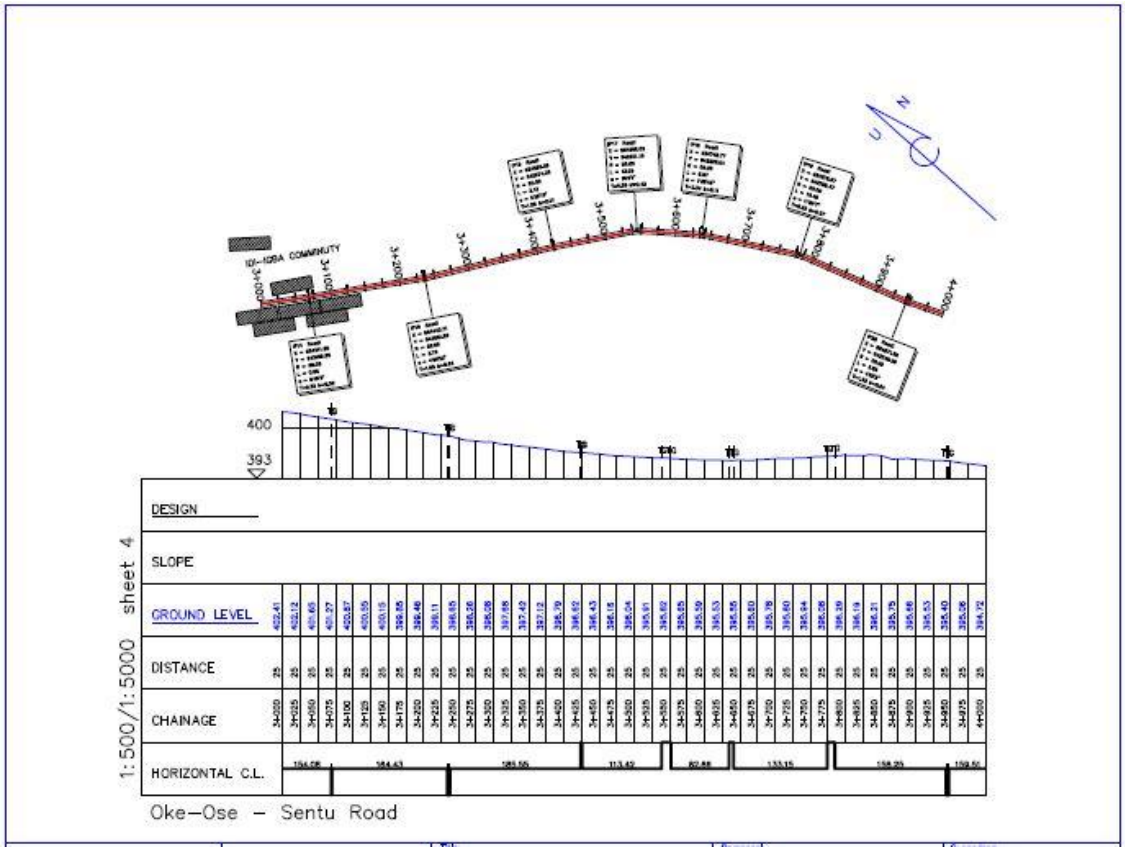

Fig. 4.3 showing the Profile and Longitudinal Section from Chainage 3+000 – 4+000

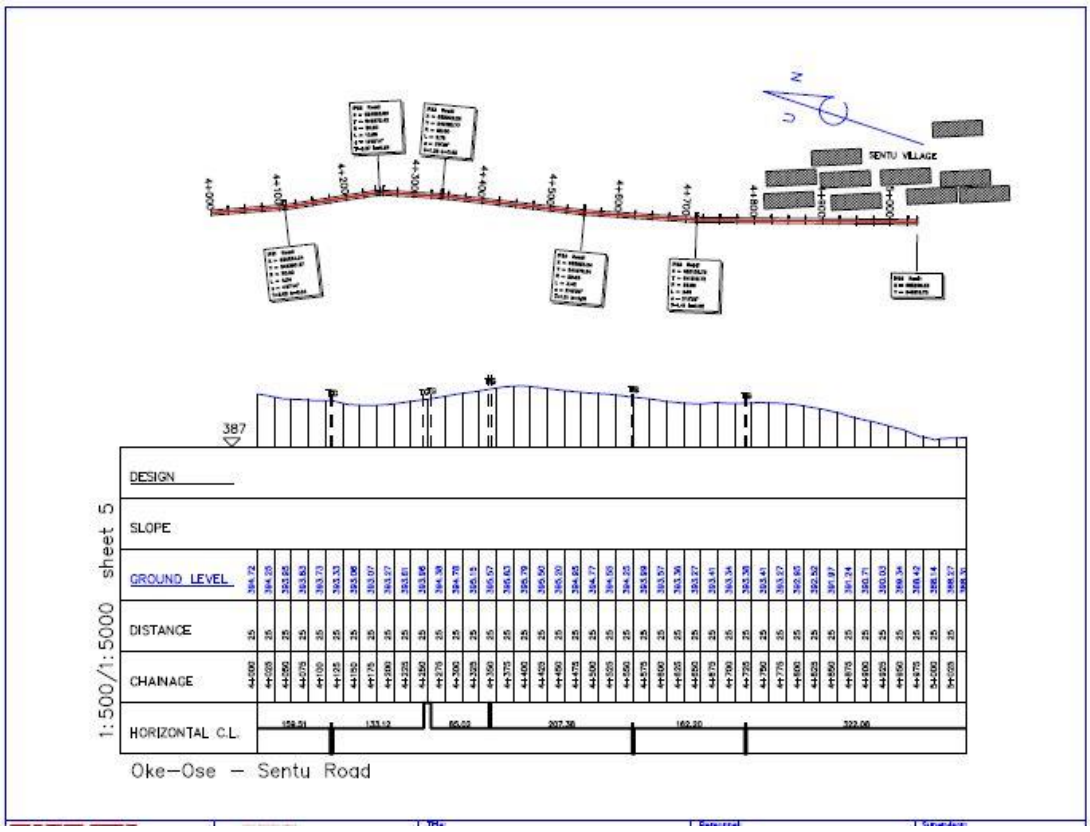

Fig. 4.4 showing the Profile and Longitudinal Section from Chainage 4+000 – 5+025

CHAPTER 5

5.0 SUMMARY, PROBLEM ENCOUNTERED, RECOMMENDATION AND CONCLUSION.

5.1 SUMMARY

The project covered a total length of 5km. The field work however involved the following processes; Recce, Monumentation traversing and detailing. CORS was used for data acquisition and its software for downloading and transforming the acquired data respectively. The adjusted coordinates were used for the production of the final plans.

5.2. PROBLEMS ENCOUNTERED

- Accuracy concerns: Accuracy decrease distance from the CORS station. Interference from vegetation or buildings which also affect signal quality.
- Station Maintenance: CORS require regular maintenance and monitoring to ensure their reliability and accuracy. Unmaintained stations can introduce errors into the positioning data.
- Inadequate CORS Coverage: In areas with sparse CORS networks, the ability to provide accurate positioning across the entire route can be limited.

5.3 SOLUTION TO THE PROBLEMS

- Optimize station placement: Choose CORS that are strategically located for optimal coverage and accuracy in your survey area.
- Use higher-quality receivers: Employ survey-grade GPS receivers that are more robust to interference and capable of maintaining high accuracy.
- Implement error detection and correction techniques: Utilize post-processing techniques or real-time kinematic (RTK) methods to minimize errors.

5.4 RECOMMENDATION

Using CORS stations in route surveys offers significant advantages in terms of accuracy, efficiency, and cost-effectiveness. Choosing the appropriate CORS network, utilizing compatible equipment, and implementing effective field procedures are crucial for achieving high-quality survey results. By leveraging this technology, surveyors can achieve higher quality results while reducing project timelines and expenses.

5.5 CONCLUSION

CORS systems are a valuable tool for route surveys, providing accurate, reliable, and efficient positioning solutions. With their ability to deliver

centimeter-level accuracy and streamline survey workflows, CORS systems are becoming increasingly important for a wide range of surveying and mapping applications.

REFERENCES

California Department of Transportation, (CalTrans). Chapter 6 Global Positioning System (GPS) Survey Specifications. Surveys Manual.

http://www.dot.ca.gov/hq/row/landsurveys/SurveysManual/Manual_TOC.html .

Colorado Department of Transportation, (CDOT). Chapter 3 GPS/GNSS Surveys. Survey Manual.

http://www.dot.state.co.us/Survey_Manual/ .

Davis, Raymond E., Francis S. Foote, James M. Anderson, and Edward M. Mikhail, Surveying: Theory and Practice, Sixth Edition. McGraw-Hill, 1981.

Garmin Corporation. GPS Guide for beginners. About GPS.

http://www.garmin.com/aboutGPS .

Kavanagh, Barry F. and S. J. Glenn Bird, Surveying: Principles and Applications, Third Edition. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1992.

Meyer, Carl F. and David W. Gibson, Route Surveying and Design, Fifth Edition. New York: HarperCollins College Publishers, Inc., 1980.

Minnesota Department of Transportation, (MnDOT). Chapter 2 - Geodetic Surveys. Surveying and Mapping Manual.

http://www.olmweb.dot.state.mn.us/manual/SM_Manual.pdf .

National Oceanic and Atmospheric Agency, (NOAA) Welcome to Geodesy. NOAA national ocean service education.

http://www.oceanservice.noaa.gov/education/kits/geodesy/welcome.html .

Texas Department of Transportation (TxDOT). Section 3: Introduction to Surveys. TxDOT Survey Manual.

http://onlinemanuals.txdot.gov/txdotmanuals/ess/index.htm .

Trimble Navigation, Ltd. GPS Tutorial. All about GPS.

http://www.trimble.com/gps/index.shtml .

United States Naval Operations, (USNO). NAVSTAR Global Positioning System. Navstar GPS Operations. http://tycho.usno.navy.mil/gpsinfo.html .

Wolf, Paul R. and Russell C. Brinker, Elementary Surveying, Ninth Edition. New York: HarperCollins College Publishers, 1994.

Wyoming Department of Transportation (WYDOT). Traffic Control for Roadway Work Operations, November 2011.

APPENDIX I

1. Digital plans

APPENDIX II

Name	N	E	H
Base_0	937113.1	671374.3	290.1564
PT1	945199.3	682040.6	376.7882
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PT4	945195.8	682006.7	375.3559
PT5	945196.7	682015.1	376.0015
PT6	945195.3	682015.3	375.6575
PT7	945198.1	682029.9	376.6706
PT8	945197	682030	376.6791
TBM	945198.3	682030.3	376.5831
PT9	945196.8	682023.3	376.4395
TBM2	945195.5	682016	376.149
PT10	945180.9	682042.2	375.4776
PT11	945189.1	682045.9	376.1932
PT12	945185.8	682044.1	375.9832
PT13	945169.6	682068.4	375.8128
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PT337	943505.8	683941.2	402.4984
PT338	943501.2	683938.9	402.5274
PT339	943497.3	683936.9	402.5353
ALASE VILLAGE	943494.8	683935.2	402.6553
PT340	943487.3	683956.8	402.7385
PT341	943489.8	683959.7	402.7575
PT342	943493.1	683961.9	402.6666
PT343	943480.1	683981.2	402.8557
PT344	943477.5	683979.1	402.7316
PT345	943473.3	683976.6	402.8186
PT346	943460.8	683994.8	403.0757
PT347	943467	683999.7	403.3348
PT348	943464.3	683997.8	403.0817

PT349	943448.8	684014.6	403.3758
PT350	943451.9	684017.1	403.2569
PT351	943454.9	684019.1	403.3959
PT352	943443.2	684038.5	403.588
PT353	943439.8	684037	403.432
PT354	943435.2	684034.5	403.5069
PT355	943423	684052.1	403.583
PT356	943427.3	684055.4	403.6141
PT357	943430.5	684057.4	403.6992
PT358	943414.9	684079.3	403.8163
PT359	943410.1	684075.5	403.6772
PT360	943407.4	684073.9	403.5122
PT361	943388.6	684091.5	403.7762
PT362	943391.8	684094.3	403.7163
PT363	943395.6	684098.3	403.7253
PT364	943379.3	684114.2	403.6714
PT365	943375.8	684111.6	403.6683
PT366	943372.6	684109.1	403.6363
PT367	943355.7	684124.8	403.5133
PT368	943358.2	684127.4	403.6634
PT369	943361.6	684130.6	403.6694
PT370	943344.2	684147	403.5245
PT371	943340.8	684143.2	403.5764
PT372	943338.1	684139.7	403.5203
PT373	943320.7	684154.6	403.5264
PT374	943323.6	684158.2	403.5614
PT375	943327.6	684162.3	403.4665
PT376	943309.8	684176.9	403.4535

PT377	943306	684172.2	403.3285
PT378	943301.7	684169.1	403.5694
ALENIBORO COMMUNITY	943295.2	684165.9	403.0973
PT379	943284.4	684187.7	403.1025
PT380	943287.9	684190.6	403.1965
PT381	943291.5	684193.6	403.4116
PT382	943277.6	684210.4	403.1217
PT383	943273.9	684207.8	402.9646
PT384	943270.9	684205.8	402.9056
PT385	943256.6	684222.1	402.6606
PT386	943261.4	684225.9	402.7717
PT387	943264.2	684227.8	402.9428
PT388	943242.7	684239.7	402.5087
PT389	943246.5	684242.8	402.5398
PT390	943250.5	684245.9	402.5219
PT391	943235.6	684264.6	402.2889
PT392	943231.3	684261.2	402.3969
PT393	943226.9	684258.4	402.4078
PT394	943213.6	684275.3	402.0999
PT395	943217.4	684278.3	402.158
PT396	943221.3	684281.9	402.013
PT397	943205.2	684300.2	401.8681
PT398	943201.3	684296.6	401.715
PT399	943198.1	684293.6	401.552
PT400	943184.5	684309	401.327
PT401	943187	684311.4	401.3761
PT402	943190.6	684314.5	401.3481
PT403	943176.7	684332.8	401.1502

PT404	943173.7	684330.5	400.8842
PT405	943170.3	684328.3	401.0601
PT406	943155.2	684345.6	400.8052
PT407	943157.8	684348.9	400.6273
PT408	943161.3	684352	400.7473
PT409	943145.2	684369.7	400.2214
PT410	943142.3	684367.6	400.2464
PT411	943138.9	684364.7	400.4823
PT412	943123.2	684381.9	400.2554
PT413	943126.2	684384.6	399.9804
PT414	943129.1	684387.6	400.0895
PT415	943114.8	684405.8	399.7496
PT416	943111.1	684403.8	399.6165
PT417	943107.5	684401	399.6505
PT418	943091.8	684419	399.2945
PT419	943095.4	684421.5	399.1506
PT420	943099	684423.8	399.3997
PT421	943085.3	684442.7	399.0988
PT422	943081.9	684440.7	399.0557
PT423	943078.5	684438.6	398.9587
IDI IGBA COMMUNITY	943075.7	684436.2	399.0676
PT424	943066	684459	398.5508
PT425	943068.5	684460.3	398.3778
PT426	943071.9	684463.4	398.8219
PT427	943056.6	684483	398.321
PT428	943054.5	684481.1	398.1469
PT429	943052.2	684479.7	398.1649
PT430	943038.9	684498.5	397.99

PT431	943041.6	684500.8	397.8441
PT432	943044.2	684502.6	397.9951
PT433	943030.7	684521.9	397.7282
PT434	943027.2	684519.9	397.5842
PT435	943024.1	684518	397.6521
PT436	943011.3	684536.3	397.4482
PT437	943014	684538.6	397.3783
PT438	943017.8	684541.3	397.3963
PT439	943003.6	684559.8	397.0914
PT440	943000.7	684557.8	397.0834
PT441	942996.4	684555	397.1223
PT442	942983.3	684573.3	396.8934
PT443	942987.1	684576.8	396.7625
PT444	942990.2	684578.7	396.8495
PT445	942977.3	684597.1	396.7316
PT446	942974.4	684595.6	396.6306
PT447	942970.1	684593.1	396.6015
PT448	942957.6	684611.6	396.4636
PT449	942961.3	684614.5	396.4547
PT450	942964.4	684616.6	396.4018
PT451	942948.4	684638.3	396.2329
PT452	942945.3	684636.3	396.1168
PT453	942942	684634.4	396.2358
PT454	942928.3	684652.7	396.0799
PT455	942931.6	684655	396.0239
PT456	942934.4	684657.2	396.01
PT457	942919.5	684675.9	395.8801
PT458	942916.5	684673.4	395.897

PT459	942913.4	684670.9	396.0229
PT460	942898.1	684689.1	395.992
PT461	942901.2	684692	395.8401
PT462	942903.6	684694.2	395.6701
PT463	942881.3	684705.4	395.6951
PT464	942883.5	684707.9	395.6491
PT465	942885.9	684710.8	395.6662
PT466	942863.4	684720.8	395.5871
PT467	942865.9	684724	395.6482
PT468	942867.8	684726.7	395.4832
PT469	942849.4	684738.7	395.5092
PT470	942847.1	684735.9	395.6041
PT471	942845.2	684732.9	395.5361
PT472	942823.2	684742.6	395.53
PT473	942828	684748.8	395.4821
PT474	942831.8	684754.3	395.5552
PT475	942814.7	684767	395.5912
PT476	942808.3	684778.1	395.5143
PT477	942802.6	684776.2	395.4882
PT478	942804.9	684770.5	395.5472
PT479	942800.7	684764.9	395.5571
PT480	942798.3	684761.2	395.465
PT481	942784.9	684770.4	395.723
PT482	942787.1	684773.9	395.6591
PT483	942789.1	684777.2	395.4491
PT484	942771.9	684790.5	395.7091
PT485	942769.6	684787.7	395.6871
PT486	942767.3	684783.1	395.841

PT487	942746.2	684794.2	395.841
PT488	942747.2	684798.3	395.719
PT489	942750.1	684802.4	395.9241
PT490	942728.6	684812.4	395.961
PT491	942726.5	684808.8	396.019
PT492	942724	684805.7	396.0389
PT493	942703.8	684815.8	396.1288
PT494	942705.5	684820	396.0899
PT495	942706.9	684823.5	396.205
PT496	942685.2	684832	395.9899
PT497	942683.3	684828.8	396.1598
PT498	942681.9	684824.9	396.3408
SABO COMMUNITY	942700.7	684830.8	396.12
PT499	942662.3	684838.5	396.1607
PT500	942660.6	684835.9	396.1627
PT501	942659.4	684832.4	396.1977
PT502	942637.5	684838.7	396.8165
PT503	942638.6	684844.3	395.8056
PT504	942640.3	684848.8	395.7327
PT505	942618.5	684855.9	396.0546
PT506	942617	684852	396.0585
PT507	942615.5	684848.3	395.6225
PT508	942594.7	684855	395.6774
PT509	942594.9	684860.6	395.6794
PT510	942596.2	684864.5	395.5445
PT511	942572.8	684870.5	395.4184
PT512	942571.9	684865.3	395.5373
PT513	942570.1	684861.2	395.5612

PT514	942547.4	684867.6	395.5091
PT515	942548.3	684871.6	395.4762
PT516	942549.5	684876.4	395.4712
PT517	942527.1	684883.1	395.1201
PT518	942525.3	684878.2	395.104
PT519	942523.8	684874.8	395.165
PT520	942504.5	684881.6	395.2779
PT521	942504.7	684886.6	394.918
PT522	942505.6	684890.5	394.842
PT523	942483.6	684899	394.4579
PT524	942481	684894.2	394.3448
PT525	942479.3	684890.8	394.3748
PT526	942459.5	684899	394.0797
PT527	942461.3	684903.1	393.9368
PT528	942462.9	684907.1	393.9938
PT529	942443.1	684917.1	393.9038
PT530	942440.8	684913.1	393.9077
PT531	942438.5	684909.2	394.0016
PT532	942417.9	684919.9	393.6826
PT533	942418.8	684923.7	393.6616
PT534	942420.7	684927.4	393.8017
PT535	942399.4	684937.8	393.8146
PT536	942397.4	684934.3	393.7496
PT537	942395.4	684931.4	393.8265
PT538	942376.3	684940.9	393.1745
PT539	942377.8	684945.1	393.1815
PT540	942379.9	684949.1	393.3016
PT541	942357.8	684960.9	392.8755

PT542	942355.1	684957	393.0325
PT543	942352.5	684953	392.9864
PT544	942333.7	684964.1	393.1104
PT545	942335.1	684966.8	393.0774
PT546	942336.9	684970.1	393.0615
PT547	942316.8	684980.7	393.4094
PT548	942315	684977.4	393.2634
PT549	942312.8	684974	393.4113
PT550	942292.9	684984.6	393.6503
PT551	942294.5	684988.8	393.5963
PT552	942295.8	684992.1	393.8044
PT553	942274.7	685002.9	394.0113
PT554	942272.4	684998.6	393.9422
PT555	942270.3	684995.2	394.0232
PT556	942250.1	685002.7	394.3881
PT557	942251.4	685006.3	394.2462
PT558	942252.9	685010.2	394.5312
PT559	942230.9	685016.9	394.6821
PT560	942229.3	685012.6	394.62
PT561	942228.5	685008.6	394.753
PT562	942205.9	685014	395.0919
PT563	942206.3	685017.4	394.9939
PT564	942207.4	685022.4	395.108
PT565	942184.5	685026.3	395.5768
PT566	942183.8	685022.3	395.4278
PT567	942182.4	685018.3	395.5327
PT568	942160.9	685023.1	395.6606
PT569	942161.6	685026.9	395.7736

PT570	942162.3	685031	395.7387
PT571	942138.4	685037.3	395.8365
PT572	942137.3	685032	395.9045
PT573	942136.1	685027.6	395.9264
PT574	942114.1	685033.3	395.6873
PT575	942114.6	685036.9	395.6823
PT576	942115.6	685041.7	395.5394
PT577	942091.7	685045.3	395.4452
PT578	942090.9	685041.8	395.3602
PT579	942089.5	685038	395.4101
PT580	942067.4	685042.8	395.185
PT581	942067.8	685046.3	395.104
PT582	942068.7	685050.1	395.1771
PT583	942045.6	685056	394.803
PT584	942044.4	685052.1	394.8289
PT585	942043.3	685047.6	395.2068
PT586	942022.1	685052.6	394.8137
PT587	942023	685057.5	394.6988
PT588	942024	685060.7	394.4838
PT589	942001.2	685064.5	394.5327
PT590	942000.6	685061.4	394.4856
PT591	941999.9	685057.7	394.6626
PT592	941977.9	685061.9	394.4264
PT593	941978.2	685065.2	394.2385
PT594	941978.6	685068.7	394.2355
PT595	941956.1	685074	394.0724
PT596	941955.4	685070.6	393.9873
PT597	941954.9	685067.3	394.1103

PT598	941931.1	685071.5	393.9181
PT599	941931.8	685075.7	393.5872
PT600	941932.6	685079	393.5632
PT601	941910.1	685084.5	393.4451
PT602	941908.9	685081.2	393.3271
PT603	941907.5	685077.6	393.454
PT604	941884.6	685083.9	393.3579
PT605	941886.8	685091.8	393.294
PT606	941885.6	685088.1	393.2559
PT607	941864.5	685098.7	393.3139
PT608	941862.4	685093.9	393.4578
PT609	941861.7	685089.2	393.2957
PT610	941840.8	685096.2	393.3476
PT611	941841.2	685100.2	393.3317
PT612	941842.5	685104.1	393.2928
PT613	941820.2	685110.7	393.4426
PT614	941818.7	685106.7	393.3076
PT615	941816.1	685101.4	393.4565
PT616	941795.8	685109.6	393.6834
PT617	941798.4	685117.8	393.4445
PT618	941797.1	685114.5	393.4265
PT619	941773.6	685116.6	393.4543
PT620	941774.7	685120.4	393.3884
PT621	941776.1	685125.5	393.5564
PT622	941752.8	685132.1	393.1173
PT623	941751	685126.7	393.2072
PT624	941749.3	685122.2	393.2872
PT625	941729	685128.8	392.9981

PT626	941729.5	685133.2	392.8461
PT627	941730.9	685137.2	392.7742
PT628	941709.3	685144.1	392.3991
PT629	941707.5	685139.3	392.423
PT630	941705.3	685135.4	392.5969
PT631	941685.8	685151.3	391.8119
PT632	941684.1	685145.7	391.8919
PT633	941682.6	685141.8	391.8788
PT634	941659.5	685148.9	391.2957
PT635	941660.7	685153.8	390.9597
PT636	941662.3	685158.4	391.1748
PT637	941642.6	685165.6	390.7387
PT638	941640.6	685161.2	390.6247
PT639	941638.7	685156.8	390.7506
PT640	941617.1	685164.8	390.1645
PT641	941618.4	685169.5	390.0186
PT642	941620.9	685174.6	390.0676
PT643	941599.5	685181.6	389.3895
PT644	941597.4	685176.9	389.4675
PT645	941595.2	685171.8	389.3384
PT646	941573.5	685179	388.6103
PT647	941574.9	685183.3	388.5753
PT648	941576.8	685187.9	388.2504
PT649	941555.5	685194.7	387.9843
PT650	941553.8	685190.8	387.9912
PT651	941552	685188.1	387.8992
PT652	941534.2	685203.7	388.6022
PT653	941510.7	685205.6	388.307