PERIMETER AND DETAIL SURVEY OF

FEDERAL STAFF SCHOOL ADEWOLE,

ILORIN, KWARA STATE

CARRIED OUT

AT

ILORIN, KWARA STATE.

BY

ADEBAYO BLESSING MARY

(HND/23/SGI/FT/0042)

SUBMITTED

TO

THE DEPARTMENT OF SURVEYING AND GEOINFORMATICS.

KWARA STATE POLYTECHNIC

IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF HIGHER NATONAL DIPLOMA IN SURVEYING AND GEO-INFORMATICS TO THE DEPARTMENT OF SURVEYING AND GEOINFORMATICS.

KWARA STATE POLYTECHNIC ILORIN. KWARA STATE

DATE:

CERTIFICATE

I hereby certify that all the information contained in this project write-up was obtained as a result of the field observations and measurements carried out by me and that the survey was executed in accordance with survey rules, regulations and departmental instructions.

Adebayo Blessing Mary ______________

(Student Name) Sign and Date

CERTIFICATION

This is to certify that I ADEBAYO BLESSING MARY carried Out this project and it have been according to survey rules and regulation and department instruction.

It has been read and approved toward meeting partial requirement for the Award of Higher National Diploma in Surveying and Geo-Informatics., Ilorin.

Surv. A. G Aremu	________________
(Project Supervisor	Sign and Date
MR. Abimbola I. Isau	__________________
(Head of Department	Sign and Date
Surv. R. S. Awoleye	__________________
(Project coordinator	Sign and Date
_____________________	__________________
External Supervisor	Sign and Date

DEDICATION

This project is dedicated to my parents and Favorite human Anjorin Emmanuel who gave me the ability to participate in this project and the ability to go through the difficult times and still end up with good result.

ACKNOWLEDGEMENT

In the name of God the most beneficent, powerful, merciful, and wonderful all praises, adoration, honor and thanks be unto Almighty God, the unique with perfect attribute, the creator of all creations. There are no amount of praise, worship and glorification that is enough to describe almighty God. Supremacy and sovereignty for showing his mercies on me in a miracle ways and see me through of my successive Higher National Diploma program (HND) to him I shall be indebted to.

My profound gratitude goes to my amiable supervisor Surv. A. G Aremu for his total effort and patience in supervising me and correcting my write-up and also to his suggestion which brought my project to limelight. Thank you so much and God bless you sir .I also stress my thanks to all staff and lecturers of the surveying and geo-informatics department MR. Abimbola I. Isau, Surv. Ayuba Abdulsalam , Surv. R. S Awoleye, Surv. Asonibare R.O,

Surv. B. F Diran, Surv. Williams Kazeem, Surv. Kabir Babatunde. Thank y'all sir for impacting knowledge to me and my Geo-mates sirs, may God almighty Bless y'all richly and continue to give wisdom and knowledge Sirs.

My sincere appreciation goes to my parents Mr. & Mrs Adebayo for their financial, moral and spiritual support and constant encouragement throughout my project, may Almighty God grant them long life and good health to reap the fruit of their labor.

I also appreciate my lovely siblings Adebayo Toluwalope and Adebayo precious for all their support and encouragement. And to my beloved one Anjorin Emmanuel, I really appreciate you for all you do for me throughout my Education right from my ND to my HND. May God almighty bless you and Answer all your Secrets prayers.

More so, thanks to my member for their contribution and also their participation throughout the time of field and office work. I pray we all succeed.

To my beloved friends osunjaiye Oluwatomiwa, Olatunji Oluwaferanmi, Adetunji oluwafunmilayo, Omolabi Marvelous, Tijani Damilola, Oladimeji Raphael, Abel Beatrice. I'll like to appreciate you guys for supporting me with prayers, financially, encouragement and advice. I pray to God to continue to bless y'all abundantly financially and spiritually. I will forever be grateful to you. I love you my Friends.

ABSTRACT

This project base on Perimeter and details survey of Federal staff's school Adewole, Ilorin Kwara states .The project state a simple explanation of the through the introduction with background of project area, statement of problem, aims, objective, scope, specification, personnel and the project location . The literature review which involves discussion previous executed of perimeter and detail survey with reference, The actual field measurement, plotting were done with the use of AutoCAD and micro soft word software for the process and analysis of the result was printed in hard copy. Finally summary, problem encountered. Conclusion and recommendation were thoroughly stated at the later part of the reports.

TABLES OF CONTENTS

List of Tables

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

*Perimeter Survey and Detailed Survey are both types of land surveying used for different purposes, especially in construction, civil engineering, land development, and property boundary assessments.

Perimeter Survey

A Perimeter Survey, also known as a boundary survey, is a comprehensive land surveying process conducted to accurately determine, define, and map the legal boundaries and extents of a specific parcel of land. It involves the precise measurement of distances and angles between various corner points of the property to establish the perimeter lines that enclose the land. This type of survey is essential in identifying the exact physical location and legal boundaries of a landholding, as defined in legal documents such as property deeds, titles, and government records.

Perimeter surveys serve as a fundamental step in property transactions, land development, and dispute resolution. They are crucial for preventing encroachments and ensuring that any construction, fencing, or land use adheres strictly to legal property lines. The surveyor typically uses instruments like total stations, theodolites, and GPS to collect data, and physical markers such as iron rods, concrete monuments, or pegs are often placed at boundary corners to provide long-term reference points.

The final product of a perimeter survey is a boundary map or plat that includes detailed information about the lengths and bearings of each side, the coordinates of all boundary points, and references to adjacent properties. This document may be submitted to municipal authorities or land registry offices for legal validation and is often accompanied by a certified report from a licensed land surveyor.

Detailed Survey

A Detailed Survey, also referred to as a topographic survey or site survey, is an in-depth and highly precise form of land surveying that captures and records the three-dimensional characteristics of a parcel of land, including all natural and artificial features present within its boundaries. This survey provides detailed information about the topography, elevations, contours, surface configurations, and existing structures, as well as utilities, vegetation, drainage features, and other physical elements.

The primary goal of a detailed survey is to support planning, engineering, and architectural design by providing a comprehensive understanding of the site's current condition. It is extensively used in the preliminary stages of infrastructure projects such as road construction, building design, drainage systems, landscaping, and urban development. By mapping both horizontal and vertical data points, the survey helps professionals assess how the terrain may affect construction, drainage, and access.

Advanced surveying instruments such as total stations, GPS/GNSS receivers, digital levels, drones, and Geographic Information System (GIS) software are commonly used to collect and analyze data. The output of a detailed survey typically includes contour maps, digital elevation models (DEMs), 3D terrain models, and detailed site plans. These deliverables often integrate into design and modeling tools used by architects, civil engineers, and planners.

Overall, a detailed survey is indispensable for the accurate planning and design of any land-based development project, ensuring the project is well-adapted to the physical realities of the site and compliant with engineering standards.

CATEGORIES OF PERIMETER AND DETAILED SURVEY

Perimeter Survey Boundary, Retracement, Subdivision, Consolidation, Fence Setout, Resurvey

Detailed Survey

Topographic, Engineering, Site,

Utility, Hydrographic, Contour

USES OF PERIMETER AND DETAILS SURVEY

Perimeter Survey

Define legal land boundaries- Property registration- Land disputes- Fencing and construction alignment- Land buying/selling- Subdivision/amalgamation.

Detailed survey

Site planning and design- Topographic mapping- Infrastructure development- Environmental studies- Drainage and irrigation design- Utility mapping.

1.1 STATEMENT OF PROBLEM

The reason for carrying out this project Operation is due to the irregular or changing boundary line between project area and its environment due to encouragement in order to help school authorities Plan for future expansion and development Of the project area, the need for a more current and Valid perimeter and detailing is suggested

1.2 AIM OF THE PROJECT

The aim of this project is to provide a perimeter and details survey of federal staffs school Adewale, llorin, Kwara State.

1.3 OBJECTIVES OF PROJECT

*To produce the perimeter and details survey plan of federal staffs school.

*To calculate the area of the project site

*To show the artificial and natural features of the school

1.4 SCOPES OF THE PROJECT

- ✓ Data Processing
- ✓ Planning

- ✓ Data acquisition
- ✓ Information presentation
- ✓ Report writing

1.5 SPECIFICATION OF THE PROJECT

- Burying of corner beacons at the corner points
- Area computation must be done using latitude and longitude single departure
- The linear accuracy should not less than 1:5000. A closed Traverse must be carried out for field work

1.6 GROUP MEMBERS

S/N	NAME	MATRIC NO	
1	Adebayo Blessing Mary	HND/23/SGI/FT/0042	AUTHOR 2025
2	Ojo Adebisi Motunrayo	HND/23/SGI/FT/0041	ASSIST
3	Dada Elizabeth Oluwapelumi	HND/23/SGI/FT/0043	ASSIST
4	Oladimeji Rapheal Oluwasegun	HND/23/SGI/FT/0045	ASSIST
5	Ibitoye Joshua Ayokunle	HND/23/SGI/FT/0047	ASSIST
6	Akinyejo Ezekieh Damilola	HND/23/SGI/FT/0051	ASSIST
7	Osunleke Habeeb Olaide	HND/23/SGI/FT/0052	ASSIST

1.7. **STUDY AREA**

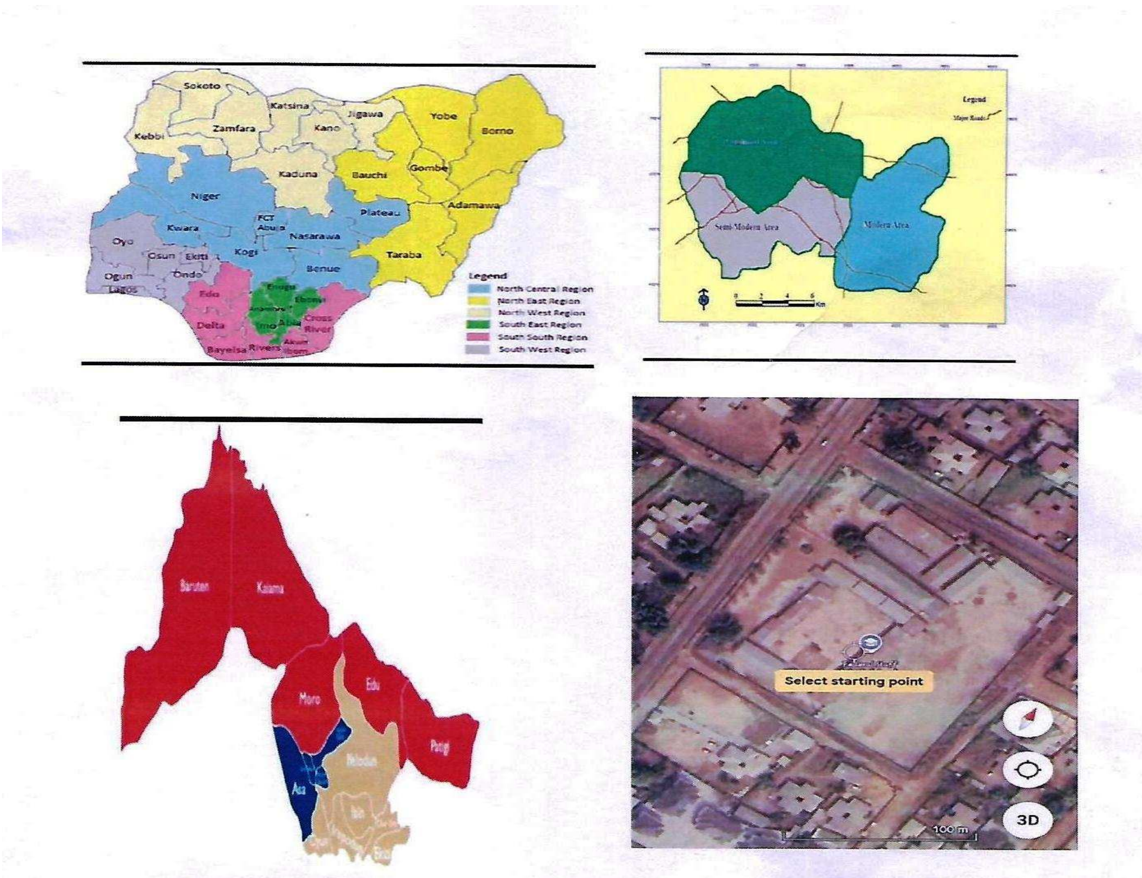
The study was carried out at the Federal Staff School, located in llorin, the Capital City of Kwara State, and Nigeria. Ilorin lies in the north-central region of the country and serves as a major administrative and educational center.

The Federal Staff School is situated along Kwara State polytechnic mini campus Agbo-Oba Road, in the llorin West Local Government Area. The school is a government-owned institution established to provide quality education for the children of federal workers and the general public.

Its campus comprises classroom buildings, administrative blocks, playgrounds, and other school infrastructure that require proper spatial documentation for effective planning and management.

Spatially, Federal Staff School, Ilorin, is located approximately within the coordinates $8^0$4777'N latitude and $4^0$513'E longitude. The school is bounded by Kano Road to the west, residential areas to the north and south, and other government facilities to the east. The perimeter of the school covers a modest area suitable for basic and secondary education activities, making it ideal for digital mapping using total station technology.

The well-defined boundary and relatively flat terrain provide a conducive environment for field data acquisition, spatial analysis, and the eventual production of a detailed digital map to support school administration and infrastructural development.



CHAPTER TWO

1. LITERATURE REVIEW

2.1 INTRODUCTION

Land surveying plays a critical role in the fields of civil engineering, urban planning, architecture, and property management. Among the various types of surveys, perimeter survey and detailed survey are fundamental, serving distinct but often complementary purposes in land development and legal boundary determination. These surveying methods provide accurate spatial data, which is essential for planning, design, legal documentation, and construction activities.

A perimeter survey, also known as a boundary or cadastral survey, is primarily conducted to define and legally establish the outer limits of a land parcel. This survey involves the precise measurement and mapping of boundary lines based on legal land descriptions found in title deeds, government records, or previous surveys. The primary objective of a perimeter survey is to protect land ownership rights, prevent encroachments, and provide reliable data for property transfer, fencing, and zoning compliance. It is particularly critical in situations involving land disputes, subdivisions, or government acquisitions.

In contrast, a detailed survey (also referred to as a topographic or site survey) is designed to gather comprehensive data about all physical features and elevation changes within a given area. This includes natural elements such as trees, rivers, and terrain, as well as manmade structures like buildings, roads, and utility lines. Detailed surveys are integral to engineering and construction projects, as they provide the foundational information required for site analysis, grading, drainage planning, and structural design. Modern detailed surveys often incorporate advanced technologies such as Total Stations, GNSS systems, drones, and Geographic Information Systems (GIS) to produce accurate and data-rich maps.

The importance of perimeter and detailed surveys has been widely recognized in the literature, particularly in the context of sustainable land development, infrastructure expansion, and urban growth. Accurate survey data ensures legal clarity, minimizes project risks, and supports informed decision-making throughout a project's lifecycle. A review of existing research and practices highlights the evolving methodologies in surveying, the integration of digital technologies, and the growing demand for precision in land measurement and spatial planning.

Several studies have emphasized the importance of perimeter surveys in establishing legal land boundaries and preventing encroachment, especially in densely populated or disputed regions. According to Agbaje and Adebayo (2015), accurate boundary demarcation is essential for minimizing land-related conflicts and ensuring equitable land distribution. Their research highlights that inconsistencies in old cadastral records and inadequate surveying practices often lead to overlapping claims and boundary disputes, particularly in developing countries. The adoption of modern geospatial tools such as GPS, Total Stations, and GIS has significantly improved the precision and reliability of boundary surveys, allowing for better alignment with legal frameworks and spatial databases.

In parallel, detailed surveys have been extensively discussed in the context of civil engineering, infrastructure development, and environmental management. Sharma and Patel (2018) noted that topographic surveys are foundational to effective site design, enabling engineers to analyze surface gradients, soil conditions, and potential hazards before construction begins. The use of LiDAR (Light Detection and Ranging) and UAV (Unmanned Aerial Vehicle) technology has further transformed detailed surveying by increasing data collection efficiency and reducing field time while enhancing accuracy. These methods have been particularly valuable in large-scale infrastructure projects, such as highway alignments, dam construction, and urban master planning.

Moreover, Wanyama et al. (2020) explored the integration of GIS-based spatial analysis with traditional surveying methods, concluding that this hybrid approach allows for dynamic mapping and real-time decision-making. They argue that both perimeter and detailed surveys benefit greatly from digital integration, as it enables layering of cadastral, environmental, and topographic data for multi-disciplinary applications.

Despite technological advancements, the literature also notes challenges such as the high cost of equipment, lack of skilled professionals, and regulatory gaps in survey standards. These challenges underscore the need for policy reform, professional training, and investment in modern surveying infrastructure to ensure both accuracy and accessibility.

2.2 CONCEPT OF PERIMETER AND DETAILS SURVEY

Concept of Perimeter Survey

The concept of a perimeter survey revolves around the identification, measurement, and legal documentation of the boundaries of a land parcel. It is primarily concerned with defining the external limits of a property to determine ownership and avoid disputes. Perimeter surveys are based on the legal descriptions provided in land records, such as title deeds, cadastral maps, and government surveys.

The core idea is to accurately mark the corners and lines that enclose a plot of land, using surveying instruments and geospatial data. This survey serves as the foundation for land registration, property transfer, subdivision, development control, and dispute resolution. The surveyor’s role is to interpret legal land descriptions and translate them into physical reference points on the ground, often marked by boundary stones, pegs, or concrete pillars.

The perimeter survey is a legal tool that ensures clarity in property ownership, prevents encroachment, and supports compliance with land use regulations. It is particularly important in urban planning, real estate transactions, and infrastructure development, where the exact limits of land holdings must be known before design or construction begins.

Concept of Detailed Survey

The concept of a detailed survey, also known as a topographic or feature survey, is based on the collection of comprehensive spatial data about all physical features—both natural and artificial—within a given area of land. Unlike the perimeter survey, which focuses only on boundaries, the detailed survey records everything inside the site, including elevation levels, terrain configuration, trees, buildings, roads, drainage systems, utility lines, and other surface features.

This type of survey is essential for engineering design, site planning, and environmental assessment. It provides accurate and detailed maps or models of the land's surface, often using modern surveying technologies like total stations, GPS/GNSS systems, drones, and GIS software. The primary output is a topographic map, which includes contours, spot heights, and symbolic representation of features, often used by engineers, architects, and planners to make informed design and construction decisions.

The concept is rooted in the idea that any construction or land development should be informed by a thorough understanding of the existing conditions on the ground. It enables better project planning, reduces risks during construction, and supports sustainable and efficient land use.

2.2.1 COMPONENTS OF PERIMETER AND DETAILS SURVEY

Component	Perimeter Survey	Detailed Survey
Legal Documents	Title deeds, cadastral records	Site plans, previous topographic data
Control Points	Boundary corners, traverse points	Benchmarks, horizontal and vertical controls
Instruments Used	Total station, theodolite, GPS	Total station, level, GPS, drones, GIS

Features Recorded	Boundary lines, corner points, fences	Terrain, elevation, buildings, roads, utilities
Markers	Concrete pegs, iron rods	Temporary points or flags for features
Data Output	Boundary map, coordinates, land area	Topographic map, contours, 3D models
Main Objective	Legal land boundary definition	Surface feature mapping for design and planning

2.2.2 PRINCIPLES OF PERIMETER AND DETAIL SURVEY

The perimeter survey of Federal Staff's School, Adewole is guided by established surveying principles, applied to legally define and secure the land boundaries of the school premises.i.e. Legal conformity, accuracy, permanency, boundary identification, documentation.

While

The detailed or topographic survey of Federal Staff's School, Adewole involves collecting data on internal features of the site for design, construction, or maintenance purposes (e.g., drainage design, classroom expansion, sports field layout).

2.2.3 TOOLS AND TECHNOLOGY

Total Station: we used it to Measures angles and distances electronically for high-precision mapping.

GNSS/GPS Receiver: Global Navigation Satellite Systems (GNSS), including GPS, provide accurate location data.

Handheld GPS: devices or smartphone apps can be used to survey Federal Staff School's premises.

Prism and Staff: Reflects signals back to the total station for distance measurement.

2.2.4 APPLICATIONS IN EDUCATIONAL SETTINGS

Perimeter surveys are primarily employed to establish the legal boundaries of school properties. As noted by Adebayo and Umeh (2015), the establishment of clear and permanent land boundaries through perimeter surveys helps schools avoid land encroachment, resolve boundary disputes, and fulfill legal requirements for property registration. For institutions owned by government agencies, such as Federal Staff's Schools, perimeter surveys validate land ownership and provide critical documentation for federal asset records and development approvals, Detailed surveys support the design and layout of school facilities by capturing essential data on terrain, elevation, existing structures, vegetation, and utility lines. Udo and Okereke (2020) emphasize that topographic data is critical for school construction projects—such as classroom blocks, laboratories, playgrounds, and drainage systems—as it ensures that design decisions are responsive to ground conditions and site constraints.

In addition, detailed surveys enable spatial planning for future infrastructure development by identifying the most suitable areas for expansion, access roads, and water control measures. GIS integration with detailed survey data, as highlighted by Onuoha et al. (2021), further aids in producing digital campus maps for asset management, emergency planning, and site monitoring in modern educational facilities.

2.2.5 CHALLENGES AND CONSIDERATIONS

Perimeter and detailed surveys are vital components in the planning, development, and land administration of educational institutions such as Federal Staff's School, Adewole. However, as documented in various studies (Olajide et al., 2018; Adebayo & Umeh, 2015), the application of these surveying processes in public school environments is often fraught with challenges that span legal, technical, environmental, and administrative domains.

2.2.6 RELEVANCE TO FEDERAL STAFF'S SCHOOL

The application of perimeter and detailed surveys holds significant relevance for the planning, development, and management of public educational institutions such as Federal Staff's School, Adewole, located in Ilorin, Kwara State, Nigeria. As a federally owned institution, the school occupies a strategic parcel of land within a growing urban area. Therefore, accurate spatial data and boundary documentation are not only critical for effective campus development but also for land security and administrative accountability.

2.3 GIS APPLICATIONS IN EDUCATIONAL INSTITUTIONS

The integration of Geographic Information Systems (GIS) in educational institutions has increasingly become an essential tool for improving spatial analysis, campus planning, and educational resource management. Over the past two decades, numerous studies have explored the diverse ways GIS supports both administrative and pedagogical functions within school environments. This literature review examines existing research on how GIS is applied in educational contexts, with a focus on facility planning, student management, safety preparedness, and curriculum development.

Several scholars have emphasized the use of GIS in the design, mapping, and development of school infrastructure. According to Onuoha et al. (2021), GIS facilitates the creation of digital campus maps that include buildings, access roads, utilities, green spaces, and emergency exits. These geospatial data models allow administrators to plan for infrastructure expansion while avoiding overlapping land use and encroachments. Similarly, Udo and Okereke (2020) noted that GIS-based facility mapping improves land utilization by offering data-driven insights into space availability and construction suitability.

2.4 PERIMETER AND DETAIL SURVEY IN NIGERIA AND KWARA

Perimeter and detail surveying is a foundational aspect of land administration, infrastructure planning, and urban development in Nigeria. These surveys are used to establish legal boundaries (perimeter) and to gather in-depth information about physical features, elevations, and improvements on a parcel of land (detail survey). In Nigeria, these surveys are regulated by federal and state laws, overseen by licensed surveyors, and play a critical role in urban planning, school development, agriculture, and real estate management. In Kwara State, perimeter and detail surveys are essential for public works, land ownership documentation, and institutional planning—particularly in cities like Ilorin, which are experiencing rapid urban growth.

Perimeter surveys are primarily conducted to define and legally document the boundaries of a parcel of land. According to Adebayo & Umeh (2015), accurate perimeter surveys serve as the legal foundation for issuing Certificates of Occupancy (C of O) and preventing land encroachment—an issue prevalent in urban and peri-urban areas across Nigeria. In Kwara State, where urban development is expanding rapidly in areas like Ilorin and Asa LGA, perimeter surveys have become essential in resolving communal and institutional land boundary disputes (Olatunji, 2019).

Detail surveys provide precise information about the topographical features, physical infrastructure, and natural elements within a given site. Studies by Okoye et al. (2020) and Onuoha et al. (2021) emphasize the use of detail surveys in preparing base maps for roads, buildings, drainage systems, and utility services. In Kwara State, these surveys are widely used for:

- School facility development, such as in Federal Staff’s School, Adewole
- Public works, including road network design and storm water control
- Housing layouts, especially in state capital development projects

2.5 CONTEXT OF FEDERAL STAFFS SCHOOL ADEWOLE

Federal Staff’s School, Adewole, located in Ilorin West Local Government Area of Kwara State, Nigeria, represents a typical example of a federal educational institution operating within an urban environment undergoing rapid infrastructural and population growth. As a government-owned school established primarily to serve the children of federal civil servants and the wider community, it is situated on a sizeable land parcel managed by the Federal Ministry of Education. However, like many other public institutions in Nigeria, its land holdings and physical infrastructure face challenges related to encroachment, poor documentation, and under-utilization—issues well documented in the literature on land management and public infrastructure planning (Adebayo & Umeh, 2015; Ogunleye et al., 2018).

The need for perimeter and detail surveys in schools such as Federal Staff's School, Adewole has been underscored in various studies that focus on the spatial analysis of public assets and the preservation of government property (Onuoha et al., 2021; Abdulkareem & Olajide, 2021). These surveys help to clarify land boundaries, support campus expansion, and enable the accurate design of physical infrastructure such as classrooms, access roads, sports facilities, drainage systems, and staff quarters. When perimeter surveys are lacking, schools risk encroachment by private developers or neighboring communities—a recurring theme in urban land administration across Nigeria.

Moreover, Federal Staff's School, Adewole presents a case that aligns with studies advocating for the integration of geospatial technologies in educational planning (Okafor & Bello, 2020). Through detail surveying and GIS mapping, institutions can create digital records of their physical layouts, manage spatial data on existing facilities, and prepare for future development. The literature suggests that applying such techniques improves not only land governance but also safety planning, resource allocation, and long-term sustainability of educational infrastructure (Adekunle, 2019; Olajide et al., 2018).

Additionally, Kwara State's unique land administration system, characterized by increasing urbanization and decentralization of surveying functions, provides a local context for the challenges faced by institutions like Federal Staff's School. As highlighted by Ajibade

(2020), state-level survey departments often lack modern tools, technical staff, and streamlined processes, making it difficult for schools to carry out timely perimeter and detail surveys. This underscores the importance of both federal and state collaboration in securing educational infrastructure.

2.6 THEORETICAL FRAMEWORKS

Theoretical Framework in Literature Review

The application of perimeter and detail surveys in educational institutions such as Federal Staff's School, Adewole can be effectively understood through theoretical contributions from the fields of Land Administration, Spatial Planning, and Systems Thinking. These theories provide the conceptual basis for evaluating how surveying techniques contribute to land security, infrastructure development, and institutional planning—topics that are well-explored in existing academic literature.

1. Land Administration Theory

Land Administration Theory focuses on the management of land ownership, use, value, and development. According to Williamson et al. (2010), land administration is fundamental to land tenure security, spatial planning, and public service delivery. The literature emphasizes that perimeter surveys serve as a foundation for documenting property boundaries, issuing legal titles, and reducing land-related disputes, especially in urbanizing regions of Nigeria (Adebayo & Umeh, 2015; Ogunleye et al., 2018).

For institutions like Federal Staff's School, Adewole, the lack of clearly defined boundaries has been linked to unauthorized encroachment and disputes with neighboring communities (Ajibade, 2020). The theoretical lens of land administration therefore supports the role of perimeter surveys in safeguarding government-owned educational land.

2. Spatial Planning Theory

Spatial Planning Theory addresses the strategic and coordinated use of land and resources to promote sustainable development. As noted by Healey (1997) and later reaffirmed by Okoye et al. (2020), effective spatial planning relies on accurate and up-to-date spatial data—usually obtained through detailed surveys. This data underpins the design and allocation of educational infrastructure such as classrooms, sports facilities, drainage systems, and access roads.

In Nigerian literature, studies such as Olajide et al. (2019) have demonstrated the importance of detail surveys in developing responsive and scalable school master plans. For Federal Staff's School, Adewole, this theory justifies the use of survey data for both present planning and future expansion, especially as the population of Ilorin continues to grow.

3. Systems Theory

Systems Theory, originally developed by von Bertalanffy (1968), is widely applied in management and planning disciplines. It views institutions as systems composed of interrelated components working toward common objectives. In the context of educational infrastructure, Systems Theory helps explain how surveying activities are not isolated tasks but are integral to the overall functioning of the institution—including administration, planning, security, and budgeting (Onuoha et al., 2021).

In the literature, Adekunle (2019) notes that without proper boundary demarcation and spatial data, schools are unable to efficiently allocate land, prevent encroachment, or plan for safe and accessible learning environments. Systems Theory thus supports the inclusion of surveying as a core component of institutional development strategy

2.7 REVIEW OF RELATED STUDIES

Several studies underscore the role of perimeter surveys in establishing and securing legal land boundaries. Adebayo and Umeh (2015) examined land tenure systems in Southwestern

Nigeria and highlighted how the absence of accurate perimeter surveys often results in land encroachment and inter-community disputes. In the context of public institutions, Ogunleye et al. (2018) documented cases where federal schools in Nigeria lost significant portions of land due to unmarked or poorly surveyed boundaries. This finding is particularly relevant to Federal Staff's School, Adewole, where proximity to urban residential zones increases the risk of informal occupation or boundary disputes.

Detail surveys are critical for the physical planning and development of institutional infrastructure. Okoye et al. (2020) conducted a study on the application of detail surveys in school mapping and facility design in Southeast Nigeria. The research demonstrated how high-accuracy detail surveys inform the placement of structures, drainage systems, and pathways. Similarly, Olajide et al. (2019) found that the integration of detail survey data into school master planning significantly improved infrastructure coordination and minimized spatial conflicts in public secondary schools in Lagos.

2.8 GAP IN LITERATURE

Lack of school-specific studies: Need for micro-level analysis at institutional level (e.g., Federal Staff's School).

Poor integration of survey data in planning: Missed opportunities for smarter infrastructure layout and expansion.

GIS underused in school land management: Digital transformation of school property is underexplored.

Limited research from Kwara/North-Central: Regional gap in academic literature on surveying in education.

No empirical link between surveys and outcomes: Need for proof of impact on land security, planning, and school sustainability.

2.9: SUMMARY

Empirical studies have shown that perimeter surveys help protect school land from encroachment, while detail surveys provide vital spatial data for infrastructure layout and expansion. However, most of these studies are either generic or concentrated in major urban areas, with minimal focus on federal educational institutions—particularly in Kwara State or North-Central Nigeria.

A clear gap in the literature is the absence of localized, school-specific investigations that examine how modern surveying techniques can improve land security, infrastructure development, and digital management in public schools. Specifically, there is a lack of data-driven analysis on how such surveys are conducted and applied in settings like Federal Staff's School, Adewole, where urban growth and administrative limitations may pose significant challenges.

Thus, this study positions itself to fill a critical void by assessing how perimeter and detail surveys can be applied not just as technical exercises, but as strategic tools for school development, spatial planning, and sustainable land use management in a federal school context.

CHAPTER THREE

3.0 METHODOLOGY

This is the process where we determine the method to use , instrument to use when to go and how to carry out the project to have a successful work done at the end.

It explains the steps by step procedure equipment and technique in executing the perimeter and detailed survey of federal staff school, Adewole Kano road Ilorin. (Data processing, accuracy check and final map production.

- Working from whole to the part.
- The principle of choosing the method of survey most appropriate to meet the desired result.
- The principle of provision for adequate checks to meet the required accuracy
- Planning is divided into two stages:
- Office planning
- Field planning

3.1 OFFICE PLANNING: Office planning which could be termed as preparation,analyze and organized in the office reconnaissance involved knowing the type of instruments, purpose, specification and accuracy require of the survey to be carried out. These led to the choosing of appropriate equipment and method to be employed, also costing of the survey operation was done in the office. Information related to the give project was collected from various sources the coordinate (x, y, and z) of the initial and that of the three choosing controls used for orientation.

Tab. 3.1shows the value of Controls

Station	Northing	Easting
SC/KWI.334R	938052.240	675605.928
SC/KWI.333R	9377797.689	675548.031
SC/KWI.332R	937809.422	675500.648

3.1.1FIELD RECONNAISSANCE

The project site was visited by all the group members to have the true picture of the site for the better planning. The recce diagram was drawn alongside the carrying out and the reasonable artificial features were fixed along and within the traverse lines, the traverse was fixed to maintain perfect indivisibility.

3.2 INSTRUMENT USED

Selection of instrument to be used is:

Total station

- Tripod
- Linear tape
- Steal tape
- Field book
- Pencil
- Targets and their tripod
- Reflectors stand and target
- Nails
- Pegs
- HARDWARE USED
- Total station

- Computer system
- SOFTWARE USED
- ArcGIS
- Ms Excel
- Google earth
- Ms word

INSTRUMENT TEST

All instrument used for the executive of the project were tested before the commencement of the field observation in order to ascertain the efficiency and reliability of the instrument.

3.3 CHECKING OF INSTRUMENT ERROR (TOTAL STATION)

The total station was tested for horizontal and vertical collimination error and the instrument was mouned on a good condition before being used at the point mark (A) with the necessary adjustment. A target was set up on another point and bisect with the cross hair if the total station telescope recording the angles (i.e. horizontal and vertical).

This is where we exercise for any controls to be used for orientation; the control was checked by observation on the control pillars as to ascertained stability and reliability both linear and angular.

The check was carried out as follows:-

The total station was set on a pillar, temporary adjustment include centering, leveling, and focusing.

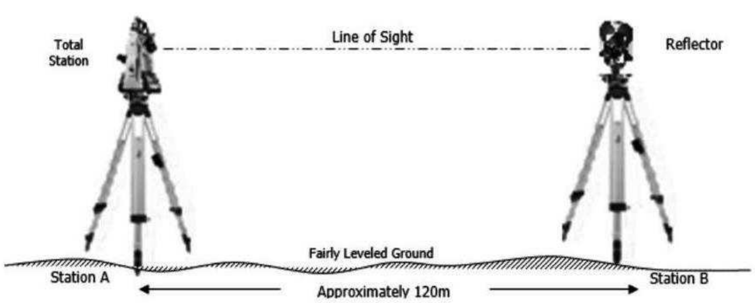


Fig. 3.1: show the instrument test.

Tab. 3.2: Show the result of instrument test

Inst Stn.	Sight (Reflector)	Face	Hor. Circle Reading	Ver. Circle Reading
	B	L	87º 35’ 10’’	88º 26’ 15’’
A	B	R	267º 35’ 12’’	271º 33’ 46’’
			Diff= 180º 00’ 02’’	Sum= 360º 00’ 01’

Horizontal Collimation = [(FR – FL) - 180º]/2

= [(180º 00’ 02’ - 180º 00’ 00’’) /2]

= 00º 00’ 02’’/2

= 00° 00’ 01’’

Vertical Collimation = [(FR – FL) - 360º]/2

= [(360º 00’ 01’’ - 360º 00’ 00’’)/2]

= 00º 00’ 01’’/2

= 00° 00’ 0.5"

3.4 MONUMENTATION

This is the process where we established and do physical marking of control point on the ground to serve as reference position. These control point are for ensuring accurate and consistency throughout digital Mapping project. The digital Mapping of federal staff school Adewole Kano road Ilorin monumentation formed the foundational frame works of the entire survey

PUROSE OF MONUMENTATION.

It serves as the origin point for horizontal and vertical measurements

It is a reference point for instrument set up

It provide permanent marker for future survey

To facilitate proper geo reference and coordinate

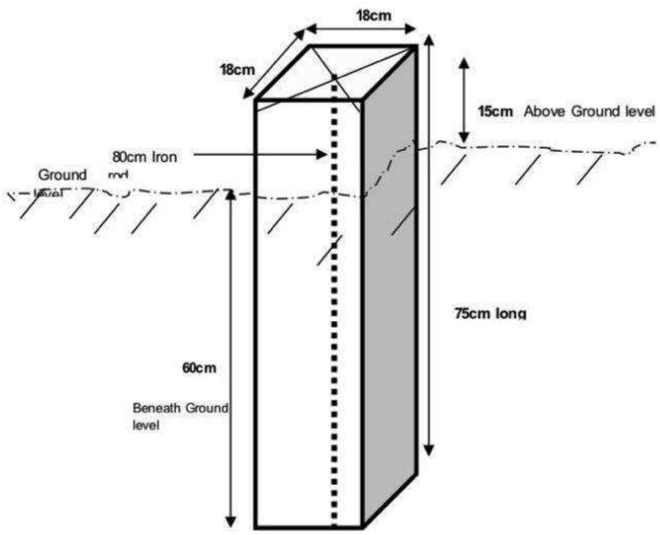


Fig.3.2 typical third order survey beacon

3.5 DATA ACQUISITION

Data acquisition is the next stage after we ave done reconnaissance, this was done on the field and it includes the determination of point’s geometry and attribute value i.e. linear measurement and the coordinating of each station using total station.

INSTRUMENT CHECK

Before carrying out the survey operation, the working condition of the instrument was checked to see if the instrument was tested. This was done by setting the instrument such as centering and parallax elimination were applied measurements was carried out by sighting a target on another station to determine both collimination and vertical error.

During the data acquisition we carry total station instrument to mount it on a tripod and level it by operating the levelling screw within the range so dat we can do temporary adjustment on the level position. We bisect the horizontal, vertical, slope and height of the land. The processor target point and compute the data of the point and display it on screen,It is stored in the electronic book. During the process of data acquisition we carry out perimeter traverse.

3.5.1 GEOMETRIC DATA ACQUISITION

Geometric data acquisitionwere obtained using total station ie combination of electromagnetic theodolite as and the electronic distance measurement (EDM). Geometric data are positional data i.e. (X,Y,Z) coordinate which make it easy to locate their actual position of features on the earth surface.

Detail is a referred to as man made and natural features on the ground with in the project site which are determined and obtained by using total station and are finally represened with a suitable scale on a plan..

3.5.2 PERIMETER TRAVERSE AND GEOMETRY POINTS GENERATION

Traverse may be defined as sequence of connected straight lines whose direction and distance has been measured, that is, it involved the determination of the bearings and distance of series of connected straight line from known coordinated point so as to obtain coordinates of the newly established station, this include the following: -

Linear measurement

Angular measurement

STATION	EASTING (m)	NORTHING (m)	REMARKS
PT1	675945.300	940823.730	Established
PT2	676048.460	940788.200	Established
PT3	675981.000	940628.000	Established
PT4	676020.620	940593.770	Established

3.6 DATA PROCESSING

This is the method in retrieving, downloading, sorting, and analysis of the acquired data (field data), the data is being downloaded from the total station to a computer system and processed into information using the appropriate method and software.

This simply refers to the graphical representation i.e. plotting of plan. it was plotted using AutoCAD and Ms-word software in a computer system and a suitable scale was used to have the hard copy format. Presented information includes; boundary, details and pegs.

Conventional signs and symbols were also used to represent features of the plan accordingly. The digital map was produced using AutoCAD software and following the under listed procedures;

- Switch on the computer and it was allowed to boot
- Start menu was clicked
- Select programs was clicked
- From the notepad, a script files for the coordinate as p-line easting, northing, was structured
- File was saved with the extension. scr.
- AutoCAD was launched
- File menu was clicked
- Sub menu [news] was clicked and the name was saved
- Format was clicked and all necessary settings were carried out [i.e. units, direction etc.]
- Then 'ok' was clicked to aspect the parameters settings
- Tools were selected
- Run script was clicked on
- Escape key was clicked, z enter and e enter were pressed one after the other in order to zoom The extent of the plan being drawn and the plotted plan was displayed
- Text was clicked
- Escape key was pressed, Z then E enter key
- Text writing and other necessary editing were done
- Coordinates of the details were all typed
- Coordinates were pasted and then the points were all displayed
- With polyline the points were joined as they were sketched.

CHAPTER FOUR

DATA PROCESSING AND ANALYSIS OF RESULT

Data processing is also referred to as the computation stage. It is the intermediary between the field observation and data presentation stage. At this stage, all the data acquired from the field were processed and analyzed in order to proceed to the final stage.

Data processing and analysis comprises of the following

Traverse field book reduction

Traverse computation

Computation of leveling

Detailing computation

Traverse field book reduction – Angular

STEPS IN DATA PROCESSING

Data Collection (Field Work)\

Perimeter Survey: Involves identifying and measuring the boundary lines of the school property using surveying instruments like a Total Station, GPS, or Theodolite.

Detail Survey: Captures topographic features within the boundary (e.g., buildings, road, trees, drainage, fences, utility poles.)

4.1 DATA DOWNLOAD AND EDITING

This is the transfer of data from the memory unit of digital instrument into the computer system for the processing and storage stage for easy retrieval. The total station was connected to the computer through a data transfer cable using a data processing software for the downloading.

DATA TRANSFER

Data collected during the fieldwork were downloaded from the Total Station to a computer system through a USB connection using the instrument’s proprietary software. The exported data included;

Horizontal and Vertical angles

Distances between survey points

Coded representing different features (building, trees and roads etc)

Control and detail points coordinates.

DATA EDITING

Error Checking: Field notes were cross checked with downloaded data to detect and correct any inconsistencies

Traverse Adjustment: The survey was adjusted to minimize closure error

Reclassification: features codes were verified and edited to correspond with standard plotting symbol

DATA PROCESSING IN AUTOCAD

To open AUTOCAD software and following the underlisted procedure:

* Switch on the computer and allowed it to boot

* Start menu was clicked

* Select program was clicked

* From the Notepad, a script files for the coordinates, line, text and other was structured.

* Files were saved with the extension Script.

* AUTOCAD was launched

* File menu was clicked

* Sub menu (New) was clicked and the name was saved.

* Format was clicked and all necessary settings were carried out (i.e units, dimension etc.)

* Then 'OK' was clicked to the aspect of parameter setting.

* Tools were selected

* Run script was clicked on.

other.

* Text was clicked

* Escape key was pressed, Z then E enter.

* Text writing and other necessary editing were done.

* Coordinates of the details were all typed.

* Coordinates were pasted and then the point were all displayed.

* With polyline the point were joined as they were sketched.

AREA COMPUTATION

	ΔE	ΔN
2 – 1	+103.16	-35.53
3–2	-67.46	-16.02
4 – 3	+39.62	-34.23
1 – 4	-75.32	+229.96

Using Double Latitude and Departure

+103.16 x - 35.53= - 3665.275

+103.16

+206.32

- 67.46 x - 106.20= + 10807.092

+138.86

- 67.46

+71.400

+ 39.62 x - 34.23= - 1356.193

+111.02

+ 39.62

+150.64

- 75.32 x + 229.96= + 34641.174

+ 75.32

- 75.32

00.00

$$\frac{\text{Sum of } + - \text{Sum of } -}{2}$$

$$= \frac{(10807.092 + 34641.174) - (-3665.275 + (-1356.193)}{2}$$

Sum of Positive = 45448.266

Sum of Negative = 5021.468

$$A = \frac{45448.266 - 5021.468}{2}$$

$$A = \frac{40426.798 = 20213.399 \text{ square}}{2}$$

$$= \frac{20213.399}{10,000} = 2.021 \text{ Hectares}$$

= 4.99 Acres

Stn.	Bearing	Distance	∆ East	∆ North	Easting	Northing	Stn.
					675605.928	938052.240	A
A	073˚ 10’ 02”	110.05	-57.891	-254.551	675548.031	937793.689	B
B	185˚ 19’ 46”	120.54	-150.574	34.798	675397.457	937832.487	C
C	254˚ 09’ 58”	110.78	103.191	-23.065	675500.648	937809.422	D
D	345˚ 16’ 25”	121.66	105.280	242.819	675605.928	938052.240	A

BACK COMPUTATION

PRODUCT APPLICATION

Uses of Detail Plan

- Detail plan is regularly used when designing for roads, buildings, extension and other new infrastructure.
- It is used to show the location and height of any number of varieties of features of an area.

COSTING

RECCI

S/N	Personnel	Quantity	Daily Rate	Days	Remark
1.	Principal Surv.	1	40,000	1	40,000
2.	Sen Surv.	1	30,000	1	30,000
3.	Asst. Surv.	1	18,000	1	18,000
4.	Basic Equipment	1	18,000	1	18,000
5.	Transportation	1	18,000	1	18,000
TOTAL					**₦124,000**

BEACON = 5,000 x 4 = 20,000

BEACONING/EMPLACEMENT OF PROPERTY BEACON

S/N	Personnel	Quantity	Daily Rate	Days	Remark
1.	Asst. Surv	1	18,000	1	18,000
2.	Skilled Labour	4	10,000	1	40,000
3.	Unskilled Labour	3	8,000	1	24,000
4.	Transportation	2	18,000	1	36,000
5.	Basis Equipment	1	18,000	1	18,000
TOTAL					**₦136,000**

TRAVERSING & CORRECTION TO CONTROL

S/N	Personnel	Quantity	Daily Rate	Days	Remark
1.	Sen. Surv	1	30,000	1	30,000
2.	Asst. Surv.	1	18,000	1	18,000
3.	Skilled Labour	4	10,000	1	40,000
4.	Unskilled Labour	3	8,000	1	24,000
5.	Transportation	2	18,000	1	36,000
6.	Basis Equipment	2	18,000	1	36,000
TOTAL					**₦184,000**

PLOTTING & DRAFTING (TOPOGRAPHY)

S/N	Personnel	Quantity	Daily Rate	Days	Remark
1.	Principal Surv.	1	40,000	2	80,000
2.	Senior Surv.	1	30,000	2	60,000
3.	Asst. Surv.	1	18,000	2	36,000
4.	System	1	46,000	2	92,000
5.	Consumable (Paper)	1	15,000	2	30,000
TOTAL					**₦298,000**

TECHNICAL REPORT

S/N	Personnel	Quantity	Daily Rate	Days	Remark
i.	Principal Surv.	1	40,000	1	40,000
ii.	Senior Surv.	1	30,000	1	30,000
ii.	Asst. Surv.	1	18,000	1	18,000
v.	System	1	46,000	1	46,000
v.	Consumable (Paper)	1	15,000	1	15,000
vi.	Secretary	1	18,000	1	18,000
TOTAL					**₦167,000**

Cumulative Total = ₦929,000

ESTIMATE

i. Accommodation 1.5% = $\frac{1.5}{100}$ x 929,000 = 13,935
ii. Mobilization/D. Mob = 10% = $\frac{10}{100}$ x 929,000 = 92,900
iii. Contingencies = 5% = $\frac{5}{100}$ x 929,000 = 46,450
iv. V.A.T = 7.5% = $\frac{7.5}{100}$ x 929,000 = 69,675

Then Assumed Total + Acct + Mob/D mob + Contingencies + VAT = Amount of Charge (For the Project)

929,000 + 13,935+ 92,900+ 46,450 + 69,675=1,161,960

= ₦1,151,960

CHAPTER FIVE

5.0 Summary, Conclusion, Recommendation and Problem Encountered

5.1. SUMMARY

The perimeter and detail survey project was executed at the Federal staffs School, Adewole, Ilorin, Kwara State. The project was carried out accordingly with third-order surveying specifications. A thorough reconnaissance both office and field-was conducted to ensure efficient planning of field operations. This preliminary stage facilitated the identification of initial control points for accurate orientation, selection of appropriate surveying instruments, and choice of a Total Station as the primary tool. A sketch diagram/recce of the area to be surveyed was also produced during this phase.

The project encompassed various surveying activities including traversing, perimeter survey, leveling, detailing, and spot height determination. A Total Station was employed as the principal instrument throughout the operation. Traversing was conducted to establish the coordinates (Northings and Eastings) of the control stations, while elevations were determined through perimeter leveling. Tachometric methods were used to acquire positional data for new points.

Subsequent to fieldwork, data processing was undertaken, and a site plan was generated in both manual and digital formats. This final map depicted the perimeter and detailed features of the surveyed area. A comprehensive report was then compiled, documenting the entire workflow and methodology applied in the execution of the project.

5.2 CONCLUSIONS

In summary, the project was successfully executed, as the results obtained met the required standards and accuracy consistent with third-order survey specifications. Sufficient data was accurately acquired, processed, and presented in the final plans. All necessary computations were carried out in line with the specified guidelines, adhering strictly to standard surveying practices and departmental regulations.

5.3. RECOMMENDATIONS

Based on my active participation in this practical project and the valuable experience gained during its execution, I offer the following recommendations:

1. Utilization of Survey Plans: The government should make use of the generated plans for informed decision-making regarding the school premises. It is also recommended that the school be properly fenced, as it is surrounded by multiple roads, posing potential security concerns.

Enhanced Resource Management: There should be improved supervision and maintenance of available resources such as the borehole, furniture (chairs and tables), and staff to ensure their effective use and longevity.

Integration of Computer Programming: The incorporation of computer programming into the curriculum is strongly recommended. This would enhance students' ability to process survey data more efficiently and accurately.

Project Availability for Review: This project and its outcomes are available for future reference, review, or further development.

5.4. PROBLEMS ENCOUNTERED

The problems we encountered at the site is somehow beyond our control cause the trees are obstructing the views between the pole man and the instrument man and the breeze keep shaking the staff but with human knowledge we were able to overcome the problem. Also the total station battery was also getting weak time to time, so it consumes us more battery and stress before getting another battery.

REFERENCES

Abdulkareem & Olajide,2021).

Adebayo and Umeh (2015)

Adekunle, 2019; Olajide et al.(2018)

Agbaje and Adebayo (2015).

Ajibade (2020)

Allan, A. L. Hollwey, J.R. Marynes, J.H.B. (1968): Practical Field Surveying and Computation, Heinemann, London. Pg.201.

BanisterA. and RaymondS. (1986): Surveying 4thEdition London, pitman publishing limited.

Dashe J. P. (1987): cadastral surveying and practice in Nigeria.

Encarta encyclopedia (2009): www.google.com

Eruteya E. O. (2009): basic principles in surveying handout

Healey (1997)

Ogunleye et al.,2018).

Ogunleye et al.,2018).

Okafor & Bello, 2020).

Olajide et al. 2019)

Olajide Et. Al (2018)

Olatunji, (2019)

Onuoha Et al. (2021)

Oxford advance leaner's dictionary (2001): 6th edition oxford university press Walton street.

Sharma and Patel (2018)

Udo and Okereke (2020)

Von Bertalanffy (1968)

Wanyama Et al. (2020)

APPENDIX

ID	EASTINGS	NORTHINGS
B1	666472	937402.5
B2	666484.9	937400.9
B3	666483.2	937390.2
B4	666470	937391.8
B5	666488.5	937412
B6	666516	937406.7
B7	666514.7	937395
B8	666486.5	937399.9
B9	666493.4	937431.3
B10	666505.4	937428.8
B11	666501.4	937411.7
B12	666489	937414.4
B13	666502.4	937464.7
B14	666512.1	937462.9
B15	666505.4	937428.8
B16	666495.4	937431.5
B17	666496.1	937473.4
B18	666501.2	937472.2
B19	666499.9	937465.1
B20	666494.2	937467
B21	666502.1	937480.3
B22	666555	937468.8
B23	666553.3	937459.1

B24	666501	937470.5
B25	666556	937468.2
B26	666563.7	937466.8
B27	666560.9	937455.8
B28	666553.1	937457.4
B29	666536.1	937394
B30	666550.7	937457.5
B31	666563.2	937454.9
B32	666548.6	937390.6
B33	666520.1	937405.8
B34	666536.3	937403.6
B35	666534.7	937393.3
B36	666516.3	937395.6
B37	666516.6	937401.6
B38	666519.4	937401.4
B39	666512.5	937495.1
B40	666559	937484.2
B41	666556.4	937472
B42	666509.4	937484.4
B43	666508.3	937512.3
B44	666546	937503.8
B45	666541.7	937489.7
B46	666505.1	937499.1
B47	666512.5	937530.7
B48	666550.1	937522.3

B49	666546	937506.4
B50	666508.8	937514.8
B51	666552.2	937521.6
B52	666564	937518.3
B53	666556.3	937489.5
B54	666545.2	937493.2
B55	666566.8	937517.6
B56	666577.2	937515
B57	666569.7	937485.5
B58	666559.1	937489.6
B59	666574.3	937526
B60	666604	937520
B61	666601.9	937508.7
B62	666572.4	937516.2
B63	666612.9	937520.2
B64	666617.9	937519.7
B65	666617.2	937510.3
B66	666611.8	937511.1
B67	666612.3	937503
B68	666617	937502.6
B69	666615.9	937491.5
B70	666611.5	937492
B71	666470.8	937486.2
B72	666474.4	937486.1
B73	666474.1	937481.5

B74	666470.7	937481.7
B75	666473.3	937500.4
B76	666476.9	937500.3
B77	666476.9	937497.6
B78	666473	937497.8
B79	666472.1	937517.6
B80	666476.4	937517.2
B81	666475.8	937510.8
B82	666471.9	937511.4
B83	666472.7	937535
B84	666478.9	937534.7
B85	666478.1	937526.2
B86	666472.2	937526.3
B87	666479.4	937539.6
B88	666485.9	937539.1
B89	666485.9	937535.6
B90	666479.2	937536.3
B91	666495	937536.2
B92	666508	937534
B93	666505.6	937519.6
B94	666492.6	937522.1
PL1	666472.2	937540.7
PL2	666618.3	937521.3
PL3	666607.4	937371.4
PL4	666468.4	937392

RD 1	666651	937536.1
RD2	666470.5	937557.3
RD3	666469.8	937584.6
RD 4	666651.8	937521.6
RD 5	666469.2	937545.7
RD 6	666463.1	937332.5
RD 7	666445.1	937341.2
RD 8	666452.1	937584.6
RD 9	666464.5	937381.6
RD 10	666609.9	937359.6
RD 11	666464.5	937381.6
RD 12	666609.9	937359.6
RD 13	666624.2	937525.6
RD 14	666608.8	937346.4
RD 15	666637.5	937523.5
RD 16	666619.4	937345.5

Ground level 18cm 18cm Beneath Ground level 75cm long 60cm 80cm Iron rod Above Ground level 15cm