A PROJECT REPORT

ON

PERIMETER AND DETAIL SURVEY OF FEDERAL STAFF SCHOOL ADEWOLE,ILORIN, KWARA STATE.

BY

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HND/23/SGI/FT/0043

SUBMITTED TO:

THE DEPARTMENT OF SURVERING AND GEO- INFORMATICS

INSTITUTE OF ENVIRONMENTAL STUDIES KWARA STATE POLYTECHNIC ILORIN.

IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF HIGHER NATIONAL DIPLOMA IN SURVEYING AND GEO INFORMATICS.

JULY 2025

CERTIFICATE

I hereby certified that all information given in this research project was obtained as a result of observation and measurement made by me and that the survey was carried out in accordance with survey rules, regulations and departmental instructions.

....

DADA ELIZABETH OLUWAPELUMI **DATE**

HND/23/SGI/FT/0043

CERTIFICATION

This is to certify that this project was carried out by **DADA ELIZABETH OLUWAPELUMI** with matric number: **HND/23/SGI/FT/0043** under my instruction and supervision for the award of Higher National Diploma in surveying and Geo-informatics, Kwara state polytechnic Ilorin,Kwara state Nigeria. I hereby declared that she has conducted herself with due diligence and honesty on the said duties

.. **........................**

SURV A.G AREMU(Project supervisor) **DATE**

.. **.............................**

SURV R.S AWOLEYE(project coordinator) **DATE**

.. **.......................**

MR A.I ISAU. Head of department(HOD) **DATE**

.... **......................**

EXTERNAL EXAMINER **DATE**

DEDICATION

This project is dedicated to Almighty God, the author and finisher of everything, who gave me the grace and privilege to attain this stage in my education persuit.

AKNOWLEGDGEMENT

I give thanks to God almighty, my creator, the author and finisher of my faith, under whose protection I have been since I was born till present.

My sincere appreciation goes to my supervisor in person of SURV A.G AREMU for his assistance and precise guidance during the course of this project. My appreciation will be incomplete if I fail to recognize my HOD of surveying an geoinformatics department in person of MR A.I ISAU for his support academically and morally. I also acknowledge my amiable lecturers in the department (surv.R.O Asonibare, surv.A.O Akinyede, surv. Ayuba abdusalam,surv. Felix diran) and all the lecturers in my department who encouraged me towards my academics, I am grateful for all your effort and support. May Almighty God bless you all (AMEN).

My profound gratitude goes to my parents: MR&MRS DADA for their supports and wisdom. Their encouragement and sacrifices have been the driving force behind my endeavours. Thank you mom and dad for being my pillars of strength and inspiration. I acknowledge this project to you with love and appreciation.

Special thanks to my siblings for their unwavering love, care and dedication that has shaped me into the person I am today,I am forever grateful.

I am also grateful to my friends in the department, church and all for their motivation and help whenever I needed it. Their collective support has made this journey more enjoyable and fulfilling

MAY GOD BLESS YOU ALL

ABSTRACT

The overall intent of this project is to provide a comprehensive assessment of the perimeter and detail survey of federal staff school adewole, Ilorin, Kwara state. This study employs a combination of geospatial techniques and detailed observations to identify boundary demarcation, security vulnerabilities and infrastructure conditions. The survey highlights areas requiring maintenance, renovation or upgrade, informing strategic planning and resource allocation for improved safety, security and operational efficiency. The findings of this survey will support informed decision making, optimize resource utilization, and enhance the overall learning environment at federal staff school Adewole.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Perimeter and detail surveying is the main aspect of survey that would be considered in this work.

Perimeter survey is a specific type of survey that measures the distance along the boundary line of a given land or area.

Perimeter survey is important to find out the correct position of land property and probably determine the extent of which such parcel of land can be evaluated in case of the land being mapped in dispute.

Perimeter and detail survey is a survey that involves transferring all the details on the land such as heights and all what is to be located on the land, which consists of both natural and artificial features. It also refers to as Cadastral Survey because it contains coordinates of all beacons, part of the boundaries and determination of relative positions of natural and artificial features on the earth surface and depicting them by means of conventional symbols on the map.

A detail survey is used to determine and locate features and improvement on a parcel of land, hence perimeter and detail survey is the type of survey that involve delineation of boundary point on the boundary line of a property, measurement and location of features in their relative positions so as to come out with a survey plan showing the details and boundary points property demarcated.

With this kind of survey, one can obtain quite a party which consists of the interior of all property line together with a list of the related corners and the types are used for building system.

Below are the reasons why this type of survey is needed

- It is a survey required from time to time so as to update the pre-existing plan and to affect change where necessary.
- If there is encroachment on a landed property, it shows the discrepancy between adjoining boundaries.
- If the property boundary is carried out, it prevents conflict between land claimers.
- The end product is useful for property identification. Perimeter and detail survey is when the subject of the survey goes in line with boundary demarcation and facilitation and limitation.

Perimeter and detail survey is a type of land survey that defines the boundaries of a particular parcel of land or real estate property. This involves surveying the entire perimeter or boundary lines of a property to determine the exact shape and geometry of the property and identify any easement that may be present within the land.

Also, perimeter survey is used to identify and to location of old boundaries, documentation and survey plans are used to set up memories. A perimeter survey does not identify the features and improvements that are situated on a property such as garages, sheds, dwelling, surface utilities, roadway, pool and visible bodies of water, only features that fall within the 15-foot width around the boundary perimeter will be located.

Also, perimeter survey resolves conflicts on maps and deeds description and shows structures such as fences, hedges, yards and walls.

Perimeter surveys are Cadastral. The measurements were taken and plotted in order to create a registerable Cadastral instrument. Detail Survey is the survey of the positions of permanent natural features within the area.

Perimeter/boundary surveys are carried out for the purpose of delineating the boundary of a parcel of land, determining its area and preparation of survey plan. The survey plan is usually the end product of a land arc survey; the survey plan shows ownership and describes the land.

A perimeter survey is usually carried out for other purposes such as:

i. Settling a land dispute

ii. Determining encroachment

iii. Subdivision of land

iv. Re-establishing missing beacons

1.2 Statement of the Problem

The reason for carrying out this project operation is due to the irregular or changing boundary line between the project area and its environment(due to encroachment), in order to help school authority outline a plan for future expansion and development of the project area, the need for a more current and valid perimeter and detailing is suggested.

1.3 Aim of the Project

The aim of this project is to carry out and produce current and comprehensive perimeter and detail survey plan of Federal Staff School, Adewole, Ilorin, Kwara State.

1.4 Objective of the Project

The following objectives are perused to achieve the aim of the project:

a. Reconnaissance which include office planning and field reconnaissance

b. Identification of existing features

c. Pegging out some selected point along the boundary line

d. Terrestrial theodolite traverse to determine X and Y coordinate of the selected point

e. Fixation of detail around the school using total station method

f. Production of plan showing the boundary lines and all details of the school

g. Project report writing

1.5 Scope of the Project

This study focuses on perimeter and detail survey of Federal Staff School, Adewole.

However, there are stages that will be involved to achieve our aim:

i. Project planning

ii. Reconnaissance

iii. Data acquisition

iv. Data processing

v. Data analysis

vi. Data preparation

vii. Technical report writing and plan production

1.6 Personnels Involved

The personnels involved in the project are Group 13 members of the Department of Surveying and Geoinformatics students 2022/2023 academic session, Kwara State Polytechnic, Ilorin.

S/N	NAME	MATRIC NUMBER	ROLE PLAYED
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1.7 Significance of the Study

The outcome of this project will provide vital foundational data that enables the school facility to be safe, functional, compliant, and well managed for both present operations and future development. They are invaluable tools for making informed decisions regarding the physical environment of the school. Other importance of this study is listed below:

i. Informed decision making

ii. Risk management

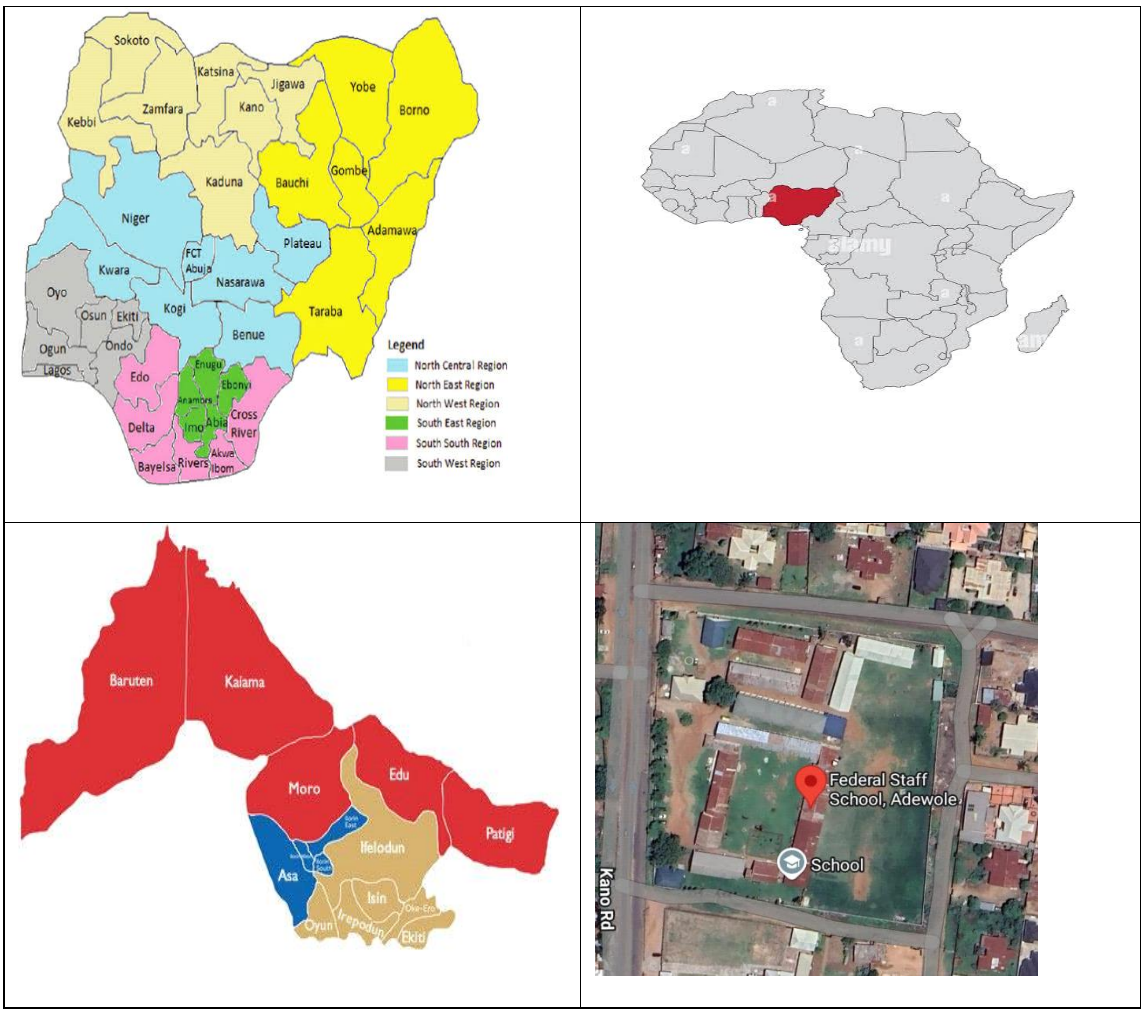
iii. Improved safety and security

iv. Optimized resource allocation

v. Enhanced facility management

1.8 Study Area

The study focuses on Federal Staff School, Adewole located in Ilorin, Kwara State, Nigeria. The school is situated in the Adewole area, a well-known residential and educational neighborhood within Ilorin West local government area. The geographic location of the study lies between latitude 8.477702, 4°30'47"N and longitude 4.510178, 8°28'40"E.



CHAPTER 2

2.0 LITERATURE REVIEW

Introduction

Surveying forms the backbone of spatial planning and land development, providing accurate data for effective land use, design, and legal documentation. Two essential components of surveying in development projects are perimeter survey and detail survey.Each plays a vital role in the planning and management of physical infrastructure,especially within institutions such as schools.

Perimeter Survey

A perimeter survey, also known as a boundary survey, is primarily carried out to define the legal limits of a parcel of land. It establishes the exact coordinates and dimensions of a property by identifying its corners, lines, and adjoining features. According to Uren and Price (2010), perimeter surveys are essential for resolving land ownership issues, preparing site plans, and securing legal rights to land.The process typically involves reconnaissance, control establishment, and the use of traverse methods—usually a closed traverse for sites like school campuses—to ensure measurement accuracy and closure. Instruments commonly used include total stations, GNSS receivers (for RTK positioning), and theodolites. Bannister and Raymond (1992) emphasized that such surveys must be precise to avoid discrepancies in boundary documentation.At Federal Staff School, Adewole, the perimeter survey is especially important for confirming the official extent of the school property and guiding future expansion or fencing projects. It ensures that any development aligns strictly within the designated land allocation, minimizing legal and spatial disputes.

Detail Survey

While the perimeter survey focuses on external boundaries, the detail survey (ortopographical survey) deals with the internal features of a site. It involves the collection of spatial data about both natural and man-made features within the survey area, including buildings, footpaths, drainage systems, trees, electric poles, andplaygrounds.Detail surveys provide essential information for planning layouts,remodeling existing infrastructure, and managing spatial resources effectively. As noted by Chandra (2015), the accuracy of a detail survey determines the reliability of any design or construction drawing based on it. Data is collected using methods like radial (radiation) surveying from control points, or using more modern tools such as GNSS systems, drones, and terrestrial laser scanners.In a school setting like that of Federal Staff School, Adewole, a detail survey aids in mapping all functional units within the campus. It supports decision-making for classroom upgrades, utility installations, and movement planning, particularly in projects that require modifying the built environment.

Perimeter and detail surveys are fundamental components of land and engineeringsurveying. These types of surveys provide precise boundary delineation and captureessential topographic and structural details within a specified area. At educationalinstitutions such as the Federal Staff School in Adewole, Ilorin, these surveys areessential for planning infrastructure, managing land use, and supporting construction and development projects.

THE CONCEPT AND RELEVANCE OF PERIMETER SURVEYING

Perimeter surveying, also known as boundary surveying, is a foundational practicewithin the broader discipline of geomatics and land surveying. It involves the precisedetermination and demarcation of the boundaries of a parcel of land. This literature review explores the core concepts underpinning perimeter surveying and examines itsmultifaceted relevance in various contemporary contexts.

Conceptual Foundations of Perimeter Surveying

At its heart, perimeter surveying is an exercise in defining legal and physical limits. C.D. Ghilani and P.R. Wolf (2012) in *Elementary Surveying: An Introduction to Geomatics* emphasize that the primary objective is to retrace or establish property lines based on existing legal descriptions, historical evidence, and physical monuments. This often involves:

Deed Research: Surveyors meticulously examine property deeds, plats, and other legal documents to understand the original intent and description of the boundary (Uren & Price, 2010). Discrepancies and ambiguities in historical records are common and require careful interpretation.

Field Data Collection: Modern perimeter surveying relies heavily on sophisticatedinstrumentation. Total stations, Global Navigation Satellite Systems (GNSS) receivers, and increasingly, Unmanned Aerial Vehicles (UAVs) equipped with LiDAR and photogrammetry, are used to collect precise spatial data of existing monuments,occupation lines, and other relevant features (Moffitt & Bouchard, 2011).

Boundary Resolution: This is often the most challenging aspect. Surveyors mustreconcile legal descriptions with physical evidence, considering principles of adversepossession, senior rights, and unwritten rights (Brown, Robillard, & Wilson, 2011). Legal precedents and common law play a significant role in resolving boundary disputes.

Monumentation: Once a boundary is determined, it is typically marked with durablemonuments (e.g., iron rods, concrete markers) to provide a clear and lasting physicalrepresentation of the property line (Anderson & Mikhail, 2012).

Planning and Reporting: The final output of a perimeter survey is typically a detailed plan or map showing the surveyed boundary, adjacent properties, easements, and other pertinent information. A written report often accompanies the plan, outlining the methodology, findings, and any discrepancies encountered (Uren & Price, 2010).

The legal implications are paramount. Perimeter surveying is not merely a technicalexercise but one deeply intertwined with property law, land tenure systems, and the rights of landowners (Dale & McLaughlin, 1999). A properly executed perimeter survey provides legal certainty and helps prevent disputes.

Relevance of perimeter surveying

The relevance of perimeter surveying extends across numerous sectors,underpinning various aspects of land administration, development, and resourcemanagement.

Property Transactions and Land Ownership Security: Perhaps the mostfundamental relevance lies in its role in facilitating secure land transactions. Beforebuying or selling property, a perimeter survey provides an accurate depiction of theland being transferred, protecting both the buyer and the seller from future boundarydisputes (Sturges, 2005). It is a cornerstone of clear title and property rights.

Land Development and Planning: For urban and rural development, accurateperimeter surveys are indispensable. They provide the base data for designingsubdivisions, infrastructure projects (roads, utilities), and ensuring compliance withzoning regulations and building codes (Larson, 2010). Without precise boundaries,orderly development would be impossible.

Dispute Resolution: Boundary disputes are a common source of litigation. Aprofessional perimeter survey often serves as crucial evidence in court, helping toresolve disagreements between neighbors over property lines, encroachments, andeasements (Brown, Robillard, & Wilson, 2011).

Resource Management and Environmental Protection: Defining propertyboundaries is essential for effective natural resource management, including forestry,agriculture, and conservation efforts. It helps to delineate ownership for resourceextraction, enforce environmental regulations, and manage land use effectively(National Research Council, 2004).

Taxation and Valuation: Property taxes are typically assessed based on the size andvalue of land parcels. Accurate perimeter surveys ensure equitable taxation byproviding precise area calculations (Sturges, 2005).

Infrastructure Projects: Large-scale infrastructure projects, such as pipelines,transmission lines, and transportation networks, require precise right-of-wayacquisition, which is entirely dependent on accurate perimeter surveying to define thelimits of acquired land (Anderson & Mikhail, 2012).

Cadastral Systems:Perimeter surveying forms the bedrock of cadastral systems,which are comprehensive land information systems that record details about landparcels, including ownership, boundaries, and land use (Dale & McLaughlin, 1999).Robust cadastral systems are vital for good governance and economic development.

THE IMPORTANCE AND PURPOSE OF DETAIL SURVEY

Detail surveying, also known as topographic surveying or site surveying, is afundamental practice in civil engineering, urban planning, architecture, andenvironmental management. It involves the precise measurement and mapping ofnatural and man-made features on a specific parcel of land. This literature reviewexplores the critical importance and multifaceted purposes of detail surveying,drawing upon established practices and scholarly insights.

I. Defining Detail Surveying and its Core Components

Detail surveying systematically collects spatial data, including:

Natural Features: Topography (contours, elevations), hydrology (rivers,streams,lakes), vegetation (trees, shrubs), and geological formations.

Man-Made Features: Buildings, roads, fences, utility lines (above and below ground), drainage systems, and other structures.

Property Boundaries: While often a separate specialized survey (cadastral survey), detail surveys frequently incorporate or verify property lines to provide a comprehensive site context.

The output of a detail survey is typically a detailed plan or map, often in both two-dimensional (2D) and three-dimensional (3D) formats, which serves as a foundationaldocument for various projects. Modern detail surveying increasingly utilizes advancedtechnologies such as Total Stations, GPS/GNSS, LiDAR, and Unmanned Aerial Vehicles (UAVs) to enhance accuracy, efficiency, and data richness (Moyles & Tretter, 2017; Tsoukalas et al., 2020).

II. The Paramount Importance of Detail Surveying

The significance of detail surveying stems from its role in providing accurate andcomprehensive spatial information, which is indispensable for informed decision-making and successful project execution across numerous disciplines.

Risk Mitigation and Cost Savings: Accurate surveys help identify potential siteconstraints, hazards, and challenges early in the project lifecycle. This proactiveidentification allows for better planning, design adjustments, and avoids costly rework, delays, and legal disputes that can arise from unforeseen conditions (Seeley & Walker, 2016; Kavanagh, 2013).

Foundation for Design and Planning: Virtually all construction, infrastructure, and land development projects commence with a detail survey. Architects rely on precisetopographic data for building placement and grading, while engineers use it for designing roads, utilities, and drainage systems. Without accurate base maps, designs would be speculative and prone to errors (Wolf & Ghilani, 2014; Uren & Price, 2010).

Regulatory Compliance and Permitting:Local authorities and regulatory bodies often require detailed site plans as part of the permitting process for construction anddevelopment. These plans demonstrate compliance with zoning laws, building codes,environmental regulations, and setback requirements. A professional detail survey ensures that all necessary information is presented accurately for approvals (RICS,2017).

Environmental Impact Assessment: Detail surveys provide crucial baseline data forenvironmental impact assessments (EIAs). They help identify sensitive ecological areas, wetlands, floodplains, and existing vegetation, enabling developers to design projects that minimize environmental disruption and promote sustainability (Booth & Brinker, 2017).

Legal Documentation and Dispute Resolution:Survey plans are legal documents that can be used to define property boundaries, easements, and rights-of-way. In cases of property disputes or encroachments, a detail survey can provide irrefutable evidence to facilitate resolution (Kavanagh, 2013).

III. Diverse Purposes of Detail Surveying Across Disciplines

The applications of detail surveying are wide-ranging, serving distinct purposes invarious professional fields:

Civil Engineering:

Road and Highway Design:Determining optimal alignments, grades, and earthworkvolumes.

Utility Planning: Mapping existing underground and overhead utilities for avoidance during excavation and for planning new connections.

Drainage and Stormwater Management: Analyzing existing topography to design effective drainage systems and prevent flooding.

Foundation Design:Understanding sub-surface conditions and topography for stablebuilding foundations.

Architecture:

Site Planning: Optimizing building placement, orientation for solar gain, andpedestrian/vehicular circulation.

Landscape Design:Integrating hardscaping and softscaping elements with the existing terrain.

Accessibility Design: Ensuring compliance with accessibility standards by understanding existing grades and obstacles.

Urban Planning and Development:Feasibility Studies: Assessing the suitability of a site for proposed development based on existing conditions.

Master Planning: Creating comprehensive development plans for large areas, integrating infrastructure, open spaces, and land uses.

Zoning and Land Use Planning:Providing data for creating and enforcing zoningregulations.

Environmental Management:

Habitat Mapping: Identifying and mapping critical habitats for conservation efforts.

Floodplain Delineation: Assessing flood risks and informing flood mitigation strategies.

Contamination Site Assessment:Mapping the extent of contaminated areas for remediation planning.

Construction:

Setting Out: Translating design plans onto the ground for accurate construction (e.g., building corners, utility trenches).

Volume Calculations: Estimating cut and fill volumes for earthwork operations.

As-Built Surveys: Documenting the precise location of constructed elements for future maintenance and record-keeping.

IV. Emerging Trends and Future Directions

The field of detail surveying is continuously evolving with technological advancements. The integration of 3D modeling, Building Information Modeling (BIM), and Geographic Information Systems (GIS) is transforming how spatial data is collected, processed, and utilized.

3D Laser Scanning and LiDAR:These technologies provide highly dense point clouds, enabling the creation of detailed 3D models of existing conditions, which are invaluable for complex projects and historic preservation (Tsoukalas et al., 2020).

UAV Photogrammetry:Drones equipped with cameras can rapidly capture aerial imagery, from which accurate 3D models and orthophotos can be generated, particularly useful for large-scale sites and inaccessible areas (Moyles & Tretter,2017).

Integration with BIM and GIS:Seamless data exchange between surveying software, BIM platforms, and GIS systems is enhancing collaboration, streamlining workflows, and enabling more sophisticated spatial analysis for lifecycle management of assets (RICS, 2017).

THE CRUCIAL ROLE OF PERIMETER AND DETAIL SURVEY IN SCHOOL PLANNING:

Effective school planning and infrastructure development rely heavily on accurate andcomprehensive site analysis. Perimeter and detail surveys are fundamental tools in this process, providing the essential data required for legal compliance, architectural design, and civil engineering. This literature review examines the definitions, methodologies, and specific applications of perimeter and detail surveys in the context of school planning.

Understanding Perimeter and Detail Surveys

Perimeter Survey (Boundary Survey):A perimeter survey is the process of preciselydefining the legal boundaries of a specific parcel of land. It involves establishing the exact location of property lines, determining the area of the plot, and identifying anyexisting encroachments or boundary conflicts. The primary output of a perimeter survey is a formal survey plan, which serves as a legal document of ownership and land demarcation.

Detail Survey (Topographic/Contour Survey): A detail survey involves the meticulousmeasurement and mapping of the physical features of a site. This includes the existingtopography (contours and elevation changes), natural elements (such as vegetation, water bodies, and soil types), and man-made structures (including existing buildings, fences, roads, and utility lines). The result is a detailed topographic map or Digital Terrain Model (DTM), which provides a comprehensive picture of the site's characteristics and constraints.

Applications in School Planning and Design

The integration of perimeter and detail surveys is critical at various stages of schoolplanning, from initial site selection to final construction.

1. Site Acquisition and Legal Compliance (Perimeter Survey)

The perimeter survey is the first essential step in acquiring land for a new school. Itsapplications in this phase include:

Legal Verification and Boundary Delineation: The survey confirms the exact dimensions and location of the property, ensuring that the school development adheres to legal boundaries. This is crucial for obtaining land titles and permits.

Identification of Encroachments:By clearly defining the boundaries, the perimeter survey identifies any existing structures or usage that illegally extends onto the proposed school site, preventing future legal disputes.

Area Calculation for Master Planning:Accurate measurement of the site area is necessary for determining the feasible size of the school, including the allocation of space for buildings, playgrounds, and supporting infrastructure.

2. Feasibility and Concept Design (Detail Survey)

The detail survey provides the necessary data for architects and planners to assess thefeasibility of a site and develop conceptual designs. Key applications include:

Topography and Earthwork Analysis: Understanding the site's contours and elevationsis vital for designing the school's layout, determining drainage patterns, andcalculating the volume of earthwork required for grading and foundation work. This information is critical for managing construction costs and ensuring site stability.

Identifying Constraints and Opportunities:The detail survey highlights existingfeatures such as large trees, rock formations, or steep slopes that may pose constraintsto construction, as well as opportunities for integrating natural elements into theschool design.

Infrastructure Mapping:Mapping existing utilities (water, sewer, electricity) isessential for planning connections to the new school infrastructure. This helps inavoiding conflicts with existing services and optimizing the location of new utilities.

3. Detailed Architectural and Engineering Design (Perimeter and Detail Survey)

Both surveys are indispensable during the detailed design phase, ensuring that theschool's infrastructure is safe, functional, and integrated with the environment.

Accurate Placement of Buildings and Facilities:The detailed topographic informationallows architects and engineers to precisely locate buildings, ensuring compliancewith zoning regulations, setback requirements, and maximizing functional use of theavailable space.

Drainage and Stormwater Management: The detail survey provides the foundation fordesigning effective stormwater management systems. By mapping the site's elevation,engineers can plan for proper drainage to prevent flooding and erosion around theschool campus.

Road and Access Design:Detailed surveys inform the design of access roads,pedestrian pathways, and parking areas, ensuring safe and efficient circulation forstudents, staff, and visitors.

Integration of Existing Features: If the school plan involves renovating or expandingexisting structures, the detail survey accurately maps these buildings, allowing forseamless integration of new designs while maintaining structural integrity.

CHALLENGES AND LIMITATIONS OF SURVRYING A SCHOOL AREA

Surveying a school area, whether for construction, demographic analysis, safetyassessments, or educational resource planning, presents a unique set of challenges andlimitations. These issues often stem from the dynamic nature of the environment, thepresence of vulnerable populations (students), the need to maintain educational continuity, and specific regulatory and ethical considerations. This literature reviewsynthesizes common difficulties encountered in school area surveys, drawing onvarious disciplines such as urban planning, educational administration, public health,and surveying engineering.

One primary challenge is **access and disruption**. Schools are active learningenvironments with structured timetables. Any surveying activity, from physicalmeasurements to questionnaire administration, risks disrupting lessons, administrativetasks, and extracurricular activities (Johnson & Smith, 2018). Gaining access oftenrequires extensive coordination with school administration, teachers, and sometimes even parent-teacher associations, which can be time-consuming and bureaucratic. Furthermore, surveys requiring entry into classrooms or active learning spaces are particularly problematic due to the need to minimize interference with pedagogical processes (Davies et="2021").

Safety and security protocols are paramount in school environments, introducingsignificant limitations. Surveyors must adhere to strict visitor policies, includingbackground checks and escort requirements, which can delay or complicate fieldwork(National Center for School Safety, 2019). The presence of unfamiliar individuals, even professionals, can raise concerns among parents and staff, potentially leading to resistance or limited cooperation. Data collection methods involving direct interactionwith students, such as interviews or observations, are subject to stringent ethicalguidelines, including parental consent and child protection policies, which add layers of complexity and time to the survey process (British Educational Research Association, 2018).

The **dynamic nature of school populations and infrastructure** also poses aconsiderable challenge. Student enrollment numbers fluctuate annually, and demographic compositions can change rapidly (OECD, 2020). School buildings themselves are often subject to renovations, expansions, or reconfigurations, meaning that spatial data can become outdated quickly. Surveying for physical infrastructure requires careful timing to coincide with periods of low occupancy, such as holidays or weekends, which may not always align with project timelines or resource availability.

Ethical considerations and data privacy are particularly pronounced when surveying school areas. When collecting data that could identify individual students or staff, or sensitive information about the school's operations, strict adherence to privacy regulations (e.g., GDPR, FERPA) is essential (United States Department of Education, 2017). Anonymization and data security protocols must be robust, and transparency with stakeholders about data usage is crucial to build trust and ensure cooperation. The potential for misinterpretation or misuse of data, particularly when dealing with performance metrics or student demographics, necessitates careful consideration of how findings are presented and disseminated.

Finally, **resource constraints and expertise gaps** can limit the scope and quality ofschool area surveys. Schools, especially public institutions, often operate with limitedbudgets, making it difficult to allocate resources for comprehensive external surveys(Education Policy Institute, 2022). Furthermore, surveying teams may lack specialized knowledge of educational contexts, leading to survey instruments or methodologies that are not culturally sensitive or practically feasible within a school setting. Interdisciplinary collaboration, involving educational experts alongside surveyors, is often necessary to overcome these limitations.

Significance to Educational Institutions Combining perimeter and detail surveys offers a complete understanding of a site—both legally and spatially. For schools, especially government-funded ones, these surveys are instrumental in managing space, applying for infrastructural grants, and complying with physical development regulations. According to Agunbiade et al. (2022), accurate surveying data reduces risks during construction, supports future GIS integration, and ensures effective land resource utilization.In summary, the application of perimeter and detail surveys at Federal Staff School, Adewole, provides the foundational data required for sustainable development and facility management. Their joint use ensures that future construction, renovation, or extension works are spatially accurate, legally compliant, and aligned with the physical realities of the site.

Conclusion

The perimeter and detail survey of the Federal Staff School, Adewole, is vital for proper land management, infrastructural development, and academic planning. Through the integration of advanced surveying techniques and tools, accurate and reliable data can be obtained to support the long-term goals of the institution. Literature shows that combining perimeter and detail surveys provides a holistic understanding of the school's physical environment, enabling better planning and decision-making.

Perimeter and detail surveys are vital for ensuring the safety, security, and infrastructure development of educational institutions like Federal Staff School Adewole. By synthesizing existing research, this review highlights the importance and benefits of conducting such surveys. While challenges and limitations exist, the benefits of informed decision-making, risk management, and improved operational efficiency make regular surveys a worthwhile investment.

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 explain the steps by step procedure equipment and technique in executing the digital Mapping 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 .

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. 3.1 shows 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

3.1.1 FIELD 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 inorder 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 (ie 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.

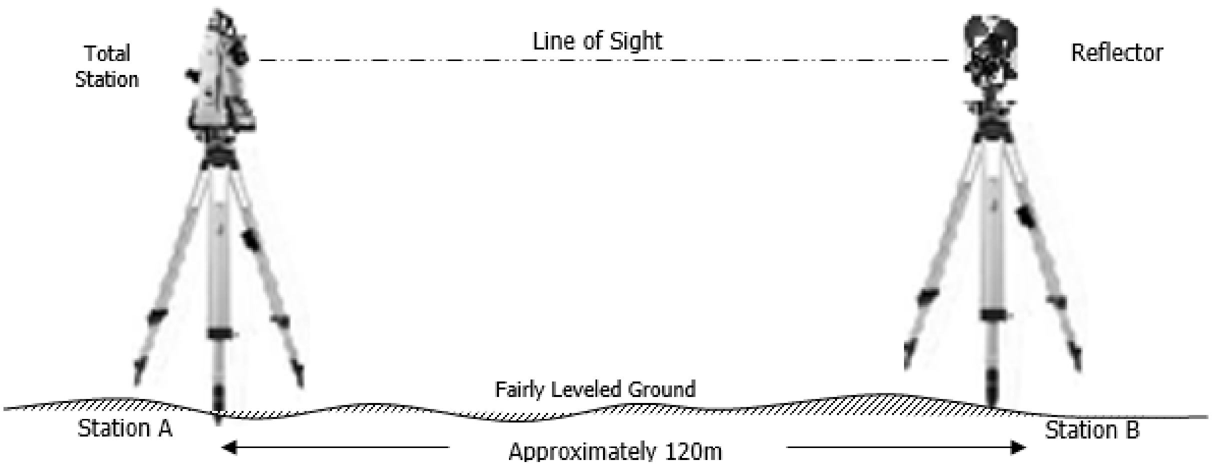


Fig. 3.1: show the instrument test.

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

$$= [(360^{\circ}\ 00'\ 01'' - 360^{\circ}\ 00'\ 00'')/2]$$

$$= 00^{\circ}\ 00'\ 01''/2$$

$$= 00^{\circ}\ 00'\ 0.5''$$

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 througout 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 seves 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.

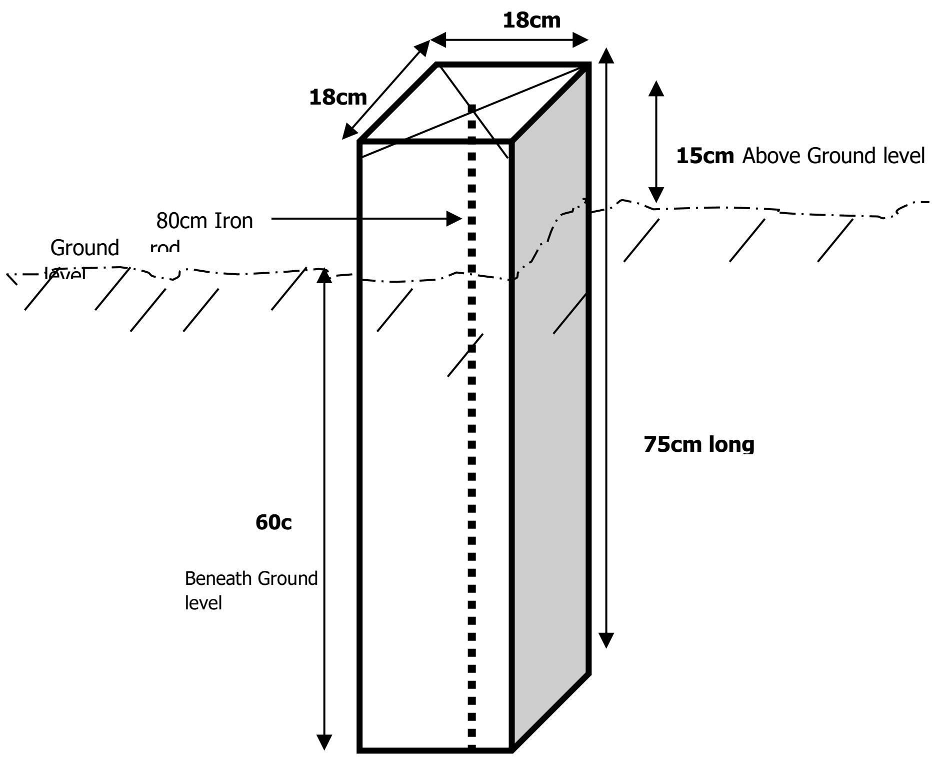


Fig.3.2 typical third order survey beacon

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 acquisition were obtained using total station ie combination of electromagnetic theodolite as and the electronic distance measurement (EDM). Geometric data are positional data ie (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 was 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.

* Escape key was clicked, Z enter and E enter were pressed three after the 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

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

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

2

Sum of Positive = 45448.266

Sum of Negative = 5021.468

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

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

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

=4.99 Acres

Stn.	Bearing	Distance	Δ East	Δ 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 Digital Map

- Digital map is used by the town planners to plan the city and villages
- Digital map reveals the features of earth and thereby enhancing effective planning and designing of construction project like miners, agriculture practitioners, engineer and military personnel.

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
•	Principal Surv.	1	40,000	1	40,000
•	Sen Surv.	1	30,000	1	30,000
•	Asst. Surv.	1	18,000	1	18,000
•	Basic Equipment	1	18,000	1	18,000
•	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
•	Asst. Surv	1	18,000	1	18,000
•	Skilled Labour	4	10,000	1	40,000
•	Unskilled Labour	3	8,000	1	24,000
•	Transportation	2	18,000	1	36,000
•	Basis Equipment	1	18,000	1	18,000
TOTAL					**₦136,000**

TRAVERSING & CORRECTION TO CONTROL

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

TOTAL	**₦184,000**

PLOTTING & DRAFTING (TOPOGRAPHY)

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

TECHNICAL REPORT

S/N	Personnel	Quantity	Daily Rate	Days	Remark
•	Principal Surv.	1	40,000	1	40,000
•	Senior Surv.	1	30,000	1	30,000
•	Asst. Surv.	1	18,000	1	18,000
•	System	1	46,000	1	46,000

•	Consumable (Paper)	1	15,000	1	15,000
•	Secretary	1	18,000	1	18,000
TOTAL					**₦167,000**

Cumulative Total = ₦929,000

ESTIMATE

- Accommodation 1.5% = $\frac{1.5}{100}$ x 929,000 = 139,350
- Mobilization/D. Mob = 10% = $\frac{10}{100}$ x 929,000 = 92,900
- Contingencies = 5% = $\frac{5}{100}$ x 929,000 = 46,450
- V.A.T = 7.5% = $\frac{75}{100}$ x 929,000 = 696,750

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

929,000 + 139,350+ 92,900+ 46,450 + 696,750=1,904,450

= ₦1,904,450

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION, RECOMMENDATION AND PROBLEMS ENCOUNTERED

5.1 Summary

The project titled perimeter and detail survey was carried out at Federal Staff School, Adewole,Ilorin, kwara State. The project was carried out in accordance with 3rd order specifications. The reconnaissance (office and field reconnaissance) properly carried out and this enhanced proper planning of the operations by locating initial controls for proper orientation of the instrument to be used. Selection of traverse station and drawing of diagram of the area to be surveyed. This project covered the aspect of traversing and detail survey using total station and its accessories.

Finally a comprehensive report was written on how the entire project was executed.

5.2 CONCLUSION

In conclusion, the successful execution of the perimeter and detail survey project has provided an accurate and comprehensive spatial representation of the surveyed area. Through the systematic application of modern surveying techniques and equipment, the boundaries of the property were precisely delineated, and detailed topographical information was collected. This information is essential for informed planning, design, development, and documentation purposes.

The project not only enhanced the understanding of the terrain and existing features within the Federal Staff School, Adewole, but also ensured compliance with professional surveying standards. Challenges encountered, such as weather interruptions or equipment calibration issues, were effectively managed, further demonstrating the reliability and effectiveness of the survey team.

Ultimately, the data obtained serves as a reliable foundation for future engineering, architectural, and construction activities, while also contributing to better land administration and management within the institution.

5.3 PROBLEM ENCOUNTERED

The challenges we encountered during the execution of this project are

* The delay in getting adequate instruments contributed to the delay of completing the field work.
* The Project was financially expensive, energetic and time consuming.
* The disagreement and misunderstanding between the project personnels on decision making.
* We worked under the sun during the later period of the project.

5.4 RECOMMENDATIONS

Here are the recommendations to make on carrying out a project on perimeter and detail survey:

Boundary Demarcation and Fencing:

There should be a Clear demarcation of all boundary lines with durable monuments (e.g., concrete pillars) and consider installing or upgrading perimeter fencing.

Building Footprints and Condition:

Comparing the surveyed building footprints with existing architectural plans. Noting any discrepancies. Assess the current condition of all structures and identify areas requiring immediate repair or renovation.

Access Roads and Pathways:

Using this project to evaluate the condition of existing access roads, pathways, and pedestrian walkways within the school compound. Making necessary repairs, widening, or new construction to improve accessibility and safety.

Drainage Systems:

To Analyze the existing drainage patterns and systems. Propose improvements to mitigate flooding, especially in areas prone to water accumulation. This might include new culverts, channels, or regrading.

Land Use Zoning:

Based on the detailed survey, there should be a proposal of a clear land use plan for the school property, designating areas for academic blocks, administrative offices, sports facilities, residential quarters (if any), playgrounds, and future expansion.

Potential for Expansion:

To Identifying of suitable areas within the school's boundaries that can be used for future expansion, such as new classrooms, laboratories, or recreational facilities.

Emergency Assembly Points and Evacuation Routes:

ensuring the accessibility of emergency assembly points. Making improvements to evacuation routes, ensuring they are clear of obstructions and well-signposted.

GIS Integration:

To Consider integrating the survey data into a Geographic Information System (GIS) for advanced spatial analysis, facility management, and decision-making.

Professional Consultation:

The school administration should be advised to consult with relevant professionals (e.g., architects, civil engineers, urban planners, security consultants) for detailed design and implementation of recommended improvements

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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	