A PROJECT REPORT

ON

PROPOSED PEDIATRIC HOSPITAL FOR URBAN SHELTER, LIFE CAMP, ABUJA

BY

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JULY, 2025.

DECLARATION

I declare that this project / Dissertation is written and composed by YUSUF BABATUNDE WALE (HND/23/ARC/FT/0026) , and this is a product of my personal research it has not been presented for the award of any degree in any polytechnic The ideas, observations, comments, suggestions here in represent my own convictions, except quotations, which have been acknowledged in accordance with conventional academic traditions and by means of references under ARC. J. M. TOMORI.

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CERTIFICATION

I Certify that this Research project / Dissertation entitled PEDIATRIC HOSPITAL was carried out by YUSUF BABATUNDE WALE under my supervision and has been approved as meeting the requirements for the award of HND in Architectural technology of Kwara State Polytechnic, Ilorin, Kwara State, Nigeria.

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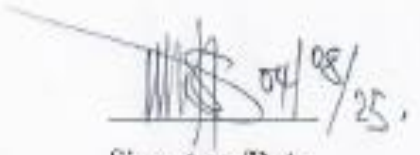

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DEDICATION

This project is dedicated to GOD Almighty and to my parents Mr. and Mrs. YUSUF

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I am grateful to ALMIGHTY ALLAH, the omniscient, omnipotent, the Alpha and Omega for granting me the opportunity to complete the project.

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TABLE OF CONTENTS

CHAPTER TWO: Literature Review

CHAPTER THREE

CHAPTER FOUR

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

LIST OF APPENDIXES

ABSTRACT

Access to specialized healthcare facilities for children remains limited in many developing regions, leading to poor health outcomes and increased mortality among infants and adolescents. This project proposes the design and development of a pediatric hospital that addresses the unique physical, psychological, and emotional needs of children within a functional, safe, and sustainable architectural framework. The specific objectives include the creation of a healing-centered design, the integration of modern healthcare services, and the provision of flexible and expandable spaces that can adapt to future healthcare demands.

The methodology adopted for this project involved site analysis, case studies of existing pediatric hospitals, user-needs assessment, and functional space programming. Design solutions were developed using architectural planning principles with a focus on child psychology, environmental sustainability, and healthcare efficiency. 3D modeling, schematic diagrams, and construction detailing were used to present and refine the design outcomes, ensuring technical viability and contextual appropriateness.

The findings revealed that spatial organization, natural lighting, intuitive wayfinding, and interactive spaces significantly enhance pediatric patient experiences and recovery rates. The design incorporates a hybrid structural system, eco-friendly materials, and centralized service infrastructure to ensure safety, durability, and cost-effectiveness. Functional zones are well-defined and interlinked to promote efficient movement and accessibility within the facility.

In conclusion, the proposed pediatric hospital demonstrates how architecture can positively impact child healthcare delivery through thoughtful and responsive design. It is recommended that future pediatric healthcare facilities adopt a child-friendly and sustainable design approach that not only meets clinical requirements but also supports emotional healing and family involvement. Community engagement, phased development, and post-occupancy evaluations are also suggested to maximize the project's long-term success and adaptability.

CHAPTER ONE

1.0 INTRODUCTION

Designing a pediatric hospital is about more than just creating a functional medical facility it's about creating a healing environment that feels safe, comforting and hopeful for children and their families.

The architecture must speak to the delicate balance of clinical precision and environmental warmth, where every space supports not only advanced healthcare but also the unique needs of young patients.

This hospital is envisioned as a place that welcomes children with open arms using natural light, playful colors, and thoughtfully designed spaces to reduce anxiety and foster a sense of calm , from the cheerful waiting areas to the bright spacious patient rooms every detail aims to make the experience less intimidating and more nurturing the goal is to create an environment, where children feel empowered, families feel supported, and the staff can work efficiently, all woven together in a design that promotes healing through compassion and connection.

1.1 HISTORICAL BACKGROUND.

Dates back to the 1Uth century when the understanding of children's health Began to evolve before this time children were often treated in general hospitals alongside adults which did not accounts for their specific medical needs. One of the dedicated children's hospitals was established in Paris France in 1802 known as the Hospital descendants maladies this marked a significant shift in pediatric care as it recognized children required specialized attention and treatment.

In the early 20th century advance medical sciences including the understanding of pediatric diseases and the development of specialized training for pediatricians for their solidified the importance of dedicated pediatric care. Pediatric hospitals began to

incorporate child friendly environments with attention to the emotional and development needs of children leading to the creation of facilities that focused on medical and holistic.

1.2 STATEMENT OF DESIGN PROBLEM

A careful study of pediatric hospital is often perceived as sterile, intimidating and overwhelming environments particularly for children and their families the challenge lies in designing a pediatric hospital that transcends the traditional clinical atmosphere, and instead fosters a sense of comfort, security and emotional well being

1.3 AIM AND OBJECTIVE OF THE PROJECT

1.3.1 Aim

The aim of this project is to design a healing, sustainable and child centered health care facility that integrates modern architectural principles with contextual sensitivity, drawing inspiration from biophilic design and vernacular architecture, the facility will prioritize natural light, ventilation, and organic materials to promote physical and emotional well-being. Emphasizing a human-centered, participatory design approach, the architecture will foster comfort, accessibility, and a sense of security for children and families alike. The overall spatial organization will reflect a therapeutic environment, incorporating flexible, modular planning, and nature-integrated courtyards, while responding to local climate, culture, and community needs through a regionally inspired aesthetic.

1.3.2 Objectives

1. To achieve sustainability and resilience.
2. To enhance flexibility and adaptability.
3. Promote Natural Healing through Light and Nature
4. Ensure Safety and Accessibility for All Ages and Abilities
5. Prioritize Family-Centered Care

1.4 JUSTIFICATION.

The proposed pediatric hospital urban shelter located at Zainab Gobir st, Abuja, at life camp opposite Bellevue estate, urban shelter is a timely and essential response to the growing need for specialized child healthcare in the region. Located in a serene and accessible part of the city, offers an ideal setting quiet, safe, and close to residential neighborhoods, which is especially important for families seeking care for their young ones.

From an architectural perspective, this hospital is not just a building it is a healing space, carefully designed to meet the emotional, physical, and psychological needs of children and their families. In a city as fast-growing as Abuja, where the urban rhythm can be overwhelming, this hospital will serve as a soft landing for children in distress a calm, welcoming environment that contrasts the typical hustle of clinical spaces.

1.5 CLIENTS BACKGROUND

Urban shelter limited is a major Nigeria real estate developer founded in 1991, with its headquarters in Abuja and operations across Lagos, Kaduna, Niger state and plans for expansion into other state. Over 30years of experience has seen the company become a trusted brand in property development, management, and real estate investment handling projects for individuals, private cooperations and government entities.

1. Demographic and catchment: The proximity to well to do residential community positions the hospital to serve families seeking quality pediatric care in a secure, accessible environment.
2. Infrastructure and Accessibility: The estate's development includes reliable roads, utilities, and security easing logistical planning for hospital operations, supply chains and patient.
3. Vision and Mission.

Vision: To build communities that go beyond housing - integrating healthcare, education,

and life style amenities into safe, inclusive and sustainable environments.

Mission: To provide infrastructural support and strategic locations that enhance community wellbeing, including facilitating health care access through partnerships and developments such as the proposed pediatric hospital near Bellevue residence.

1.6 DEFINITION

A pediatric hospital is a specialized health care facility designed and built exclusively to provide medical care, treatment and support tailored to infants, children and adolescents. Architecturally , it integrates clinical functionality with child - centric design principles that prioritize safety , comfort , and psychological wellbeing .The design of a pediatric hospital balances state of the art medical infrastructure such as advanced diagnosis and treatment spaces , infection control systems and staff workflow efficiency- with therapeutic environments that reduce anxiety and promote healing .This includes colorful, playful interiors, natural lighting, accessible navigation, family friendly zones and secure outdoor play areas.

1.7 SCOPE OF THE STUDY

This study focuses on planning of a pediatric hospital that meets the specialized health care needs of children from infants to adolescents the design will incorporate child centered care environments, family - friendly spaces and medical infrastructure while ensuring compliance with healthcare regulations and sustainability standards.

1.8 LIMITATIONS OF STUDY

The limitation experienced during this course of study include financial challenges of providing high services more complex care needs due to challenges patient sizes essential family not or for inpatient inability to give consents.

Research materials there have not been enough local sources of information and getting the proper architectural plans required for assessment during case studies was not very

easy.

1.9 RESEARCH METHODOLOGY

Methodology is essential for designing a pediatric hospital, ensuring the outcome is functional, sustainable and child focused the methodology incorporates multiple phases of data collection, analysis and design synthesis to achieve on architecture tailored pediatric healthcare needs.

Designing a pediatric hospital is not just a technical or structural challenge—it is a deeply emotional and social task. Children experience hospitals differently than adults: they are more vulnerable to stress, fear, and disconnection from their familiar world. Therefore, the methodology must be rooted in empathy, real-world observation, and inclusive engagement.

- **Primary Source:** some of the data from this project were gathered by carrying out a series of case studies and making direct observation of the data as they occur questions were asked when needed, with a view to have a better understanding
- **Case Study:** this involves visiting the existing buildings or structures of related project (Pediatric Hospital) to know needed information
- **Oral Interview:** are adopted to seek opinions of available officials and managers and were considered as a major respondent who provide a very useful information in deciding the concept and scope of the project
- **Secondary Source:** past literatures were reviewed to get some data for this work, some were collected from the internet, encyclopedia, and previous related project

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

In this chapter, introduction of pediatric hospital, history principles of designing a pediatric hospital and other related literature are discussed. This literature was studied in order to know the trend and scope for research on the design many doctoral thesis, reports and articles published in leading journals were subjected to the analysis.

Pediatric hospitals are specialized health care facilities designed to address the medical, psychological and emotional needs of children from infancy unlike general hospitals, pediatric health care architecture demands a more advanced approach that balances clinical efficiency with child centric comfort and safety.

According to Ulrich at Al, (2016) patient- centered design in health care environments. Significantly improves outcome.

Pediatric hospitals are unique among healthcare facilities in that they must meet the complex medical, psychological, emotional, and developmental needs of children. This specialized building type differs significantly from adult hospitals in function, atmosphere, and user demographics. The literature reflects a growing recognition of the importance of child-centered, family-inclusive, and developmentally supportive design within pediatric environments. This chapter reviews key issues and challenges peculiar to the pediatric hospital typology and discusses the various bases for classifying pediatric hospitals from architectural and operational perspectives.

One of the most defining challenges in pediatric hospitals is accommodating a wide range of age groups from premature newborns to adolescents. Each stage of childhood presents specific physiological and emotional needs, requiring the architectural design to adapt spatially, visually, and socially. Neonatal intensive care units (NICUs), for example, demand high levels

of technological integration and reduced sensory stimuli, while adolescent wards benefit from privacy, autonomy, and peer-oriented spaces (Ulrich et al., 2016).

Hospitalization is inherently stressful, especially for children who may not fully understand the processes or the environment. Studies show that children in clinical settings are highly affected by factors such as lighting, color, noise, and unfamiliarity (Lambert et al., 2014). Poorly designed environments can increase anxiety, slow recovery, and foster long-term fear or trauma. This underscores the importance of non-institutional design, including friendly visual themes, engaging spatial forms, and calming materials.

Family-centered care is now widely accepted as a best practice in pediatric health. Unlike adult hospitals, where patients often stay alone, pediatric hospitals must include facilities for parents or guardians who stay with their children. This introduces spatial requirements such as sleeping accommodations, kitchens, lounges, and family counseling areas within or adjacent to patient rooms. The architectural design must also balance the need for family presence with patient privacy and clinical functionality (Malkin, 2018).

Young children and immunocompromised pediatric patients are particularly vulnerable to infection. Yet they also need movement, interaction, and play for psychological well-being. This creates a fundamental design challenge: how to create open, social, and exploratory environments while still maintaining high standards of hygiene and infection control. Zoning, ventilation strategies, material choices, and circulation patterns must all be adapted to this dual imperative (Horsburgh, 2019).

Unlike adult patients, children continue to develop physically, cognitively, and socially while hospitalized. Pediatric hospitals must support these processes through architecture that encourages play, learning, and stimulation. The inclusion of playrooms, classrooms, therapeutic gardens, and interactive artwork is not a luxury but a necessity for holistic healing. These elements must be thoughtfully integrated rather than appended as decorative

afterthoughts (Verderber & Fine, 2018).

Wayfinding in pediatric hospitals serves a dual audience children and adults. Traditional signage may be inadequate or intimidating for children. Literature supports the use of visual cues, color-coded paths, landmarks, and themes to make navigation intuitive and non-threatening. Giving children some autonomy such as choosing their room color or route to therapy can promote a sense of control and reduce stress.

Pediatric hospitals can be classified based on multiple overlapping criteria. These typologies affect not only the clinical operations but also the architectural design and spatial organization.

General Pediatric Hospitals: Provide a broad range of services including emergency, surgical, oncology, and rehabilitation.

Specialized Pediatric Centers: Focus on particular conditions (e.g., cancer, cardiac care, neurological disorders).

Outpatient Pediatric Clinics: Provide routine care, diagnostics, and preventive services without overnight stays.

Standalone Children's Hospitals: Operate independently, often as major tertiary care centers with distinct architectural identity (e.g., Boston Children's Hospital).

Integrated Pediatric Units: Located within general hospitals; pediatric departments are part of a larger institutional complex.

Academic and Research-Based Hospitals: Serve dual functions of clinical care and medical education, influencing the inclusion of labs, classrooms, and conference facilities.

Tertiary Care Centers: Serve as regional referral hospitals with highly specialized services.

Secondary/Community Pediatric Hospitals: Serve local populations with general pediatric services.

Primary Care Clinics: Typically, non-hospital facilities providing preventive and basic healthcare.

Vertical Hospitals: Multistory buildings often located in dense urban environments; require efficient vertical circulation and thoughtful spatial stacking.

Horizontal Campuses: Spread across wider sites; allow for distinct zoning of departments, often with integrated outdoor spaces and courtyards.

Urban Pediatric Hospitals: Tightly integrated with city infrastructure; may prioritize access, compactness, and verticality.

Suburban/Rural Pediatric Hospitals: Often feature more natural integration, access to green space, and a more relaxed spatial structure.

Across all classifications, the goal of human-centered design remains paramount. Pediatric hospitals must be more than efficient clinical machines they must be spaces of care, dignity, and emotional support. Literature emphasizes the following architectural strategies to humanize pediatric environments.

Scaling down spatial elements to a child's perspective (e.g., low windows, small furniture, colorful fixtures)

Biophilic design that connects children with nature and reduces stress,

Symbolic and narrative design that introduces storytelling, fantasy, and engagement

Multi-sensory environments that offer positive tactile, auditory, and visual experiences

Inclusive and diverse spatial design to reflect different cultural, emotional, and developmental needs

Project Overview

Architects: Zimmar Gunsul Frasca (ZGF)

Architects: LLP

Location: Chicago, Illinois, USA,

Completion: 2012

Size: Approximately 1.25 million square feet.

Capacity: 288 private patient rooms.

2.1 HISTORICAL BACKGROUND

The design of pediatric hospitals represents one of the most sensitive and complex architectural typologies, requiring an intersection of medical functionality, emotional intelligence, and spatial empathy. This chapter traces the evolution of pediatric hospital architecture, from early utilitarian beginnings to contemporary, human-centered models. It explores the progression of design priorities—from hygiene and efficiency to healing environments—and contextualizes the spatial and experiential needs of children within institutional care settings.

Historically, the earliest hospitals for children emerged in the 19th century, coinciding with growing urbanization and rising concern for child health. These early pediatric hospitals borrowed heavily from the broader institutional design of general hospitals, emphasizing hygiene, order, and control. Facilities were often austere, with rigid layouts, long corridors, and minimal consideration for emotional comfort or psychological well-being.

Influenced by Florence Nightingale's principles of hospital design (notably the pavilion plan), early children's hospitals focused on ventilation, sanitation, and daylight. However, while these strategies aimed to improve physical health outcomes, they often neglected the psychological and developmental needs of young patients.

By the mid-20th century, medical advancements and new understandings of child psychology began to reshape hospital design. The works of child development theorists like Jean Piaget and Erik Erikson underscored the need for environments that support cognitive and emotional development, even during illness.

Architecturally, this period saw the emergence of child-friendly interiors, the integration of play spaces, and more colorful, animated environments. However, the shift remained largely superficial in many cases, with child-oriented design limited to decor and surface-level aesthetics, rather than being integrated into the spatial logic of the building.

Late 20th Century to Early 21st: Healing Environments and Family-Centered Care

The late 20th century marked a major evolution in healthcare architecture with the rise of the "healing environments" paradigm. This was fueled by research from environmental psychology and evidence-based design, which showed that factors such as natural light, access to nature, and personal control over one's environment could reduce stress and support recovery.

Pediatric hospitals began to incorporate:

- Decentralized nursing units for more personal care,
- Single-bed patient rooms to ensure privacy and reduce infection,
- Family zones within rooms and common areas, recognizing the role of parents as partners in healing,
- Thematic design elements, often inspired by nature or fantasy, to create immersive, comforting experiences for children.

Hospitals such as the Royal Children's Hospital in Melbourne (Billard Leece Partnership + Bates Smart, 2011) and the Ann & Robert H. Lurie Children's Hospital in Chicago (Zimmer Gunsul Frasca, 2012) represent state-of-the-art expressions of these values, blending technological sophistication with warm, engaging, and flexible environments that reflect the emotional and physical

Today's best pediatric hospitals embrace a humanist architectural language, recognizing that the experience of illness is not only physiological but also existential. This contemporary approach focuses on:

- Sensory design: using materials, lighting, and acoustics to create calming, non-institutional atmospheres,
- Spatial diversity: offering a range of settings (quiet nooks, open play areas, contemplative gardens),

- Urban integration: ensuring that hospitals are part of the social and civic life of the city,
- Cultural sensitivity: designing inclusive spaces that reflect and respect diverse family structures, backgrounds, and traditions.

These hospitals are not merely places of treatment; they are architectural narratives of care, blending the clinical and the emotional, the scientific and the symbolic.

The literature reflects a significant transformation in pediatric hospital architecture from sterile, rationalist facilities to emotionally intelligent spaces that prioritize the child's lived experience. The trajectory of this typology highlights a growing architectural responsibility to design not only for medical outcomes but for dignity, wonder, and humanity.

As this review demonstrates, future directions must continue to question the spatial assumptions of institutional care and instead offer environments that are therapeutic in form, restorative in atmosphere, and joyful in spirit.

2.2 FUNCTION AND SPATIAL RELATION IN PEDIATRIC HOSPITAL

Core Functions and Spatial Relationships in Pediatric Hospitals

The functional layout of a pediatric hospital typically includes the following core areas, each with specific relationships to adjacent functions:

1. **Entrance and Reception Areas**

Function: First point of contact for patients and families.

Key spatial relationships:

Close to outpatient clinics, emergency, and waiting areas.

Designed for ease of orientation and positive first impressions.

Often includes child-friendly wayfinding, interactive features, and colorful art to reduce anxiety.

2. **Outpatient Clinics**

Function: Accommodate short-term consultations, diagnostics, and treatments.

Key spatial relationships:

Linked directly to entrance/lobby.

Close to diagnostic imaging and labs.

Separation between sick and well-child waiting areas to control infection.

3. **Inpatient Wards**

Function: Provide overnight and extended care for various conditions.

Key spatial relationships:

Organized by age group or specialty (e.g., NICU, oncology, adolescent care).

Proximity to treatment areas and nursing stations is critical.

Family zones are often integrated into or adjacent to patient rooms.

4. **Emergency Department (ED)**

Function: Immediate care for acute medical issues.

Key spatial relationships:

Near ambulance access and imaging services.

Separate from elective outpatient traffic.

Often includes a fast-track zone for non-critical cases and a trauma zone for urgent interventions.

5. **Operating Theatres and Intensive Care Units (ICUs)**

Function: High-acuity procedures and recovery.

Key spatial relationships:

Centrally located for rapid access from wards and emergency.

Requires sterile circulation and buffer zones.

Pediatric ICUs and NICUs are highly controlled environments, often designed with low sensory stimulation and parental presence in mind.

6. **Diagnostic and Imaging Services**

Function: Support clinical diagnosis (X-rays, MRI, CT, labs).

Key spatial relationships:

Accessible from both inpatient and outpatient zones.

Minimally invasive routes for transporting young patients.

Imaging suites are often themed or animated to reduce fear.

7. **Family Support Areas**

Function: Support caregivers emotionally and practically.

Key spatial relationships:

Distributed throughout the hospital—lounges, kitchens, overnight rooms.

Near patient wards and sometimes embedded within them.

Positioned for privacy, but with easy access to medical staff.

8. **Educational and Recreational Spaces**

Function: Maintain continuity of development and learning.

Key spatial relationships:

Typically, close to long-term care wards.

Include classrooms, therapy playrooms, libraries.

Strong connection to outdoor play spaces, sensory gardens, and internal courtyards.

9. **Staff Areas and Clinical Support**

Function: Workspaces for clinical teams, charting, rest, and meetings.

Key spatial relationships**:**

Dispersed close to treatment zones to support decentralized care.

Visual and physical access to patients while maintaining confidentiality.

To meet the complex and emotional needs of children, pediatric hospitals integrate design features that go beyond clinical functionality. Below are distinctive architectural solutions

tailored for pediatric settings:

1. **Child-Centered Design Language**

Use of lower ceiling heights, colorful wayfinding, and scaled-down fixtures designed to feel approachable to children.

Incorporation of themes, murals, and storytelling elements to promote imagination and comfort.

2. **Sensory-Friendly Environments**

Use of calming acoustics, soft lighting, and natural textures to reduce sensory overload, particularly in wards treating neurodivergent or chronically ill children.

Designated quiet zones or sensory rooms for overstimulated patients.

3. **Play Therapy and Interactive Spaces**

Integration of playrooms, interactive walls, digital media zones, and creative installations throughout the facility—not just as isolated areas.

Embedded play spaces in waiting areas, corridors, and lobbies to encourage exploration and distraction from anxiety.

4. **Family-Integrated Patient Rooms**

Patient rooms designed with dedicated family zones, including sleeping couches, private bathrooms, and storage—reflecting the model of rooming-in.

Sliding partitions or flexible layouts to allow for both privacy and nurse visibility.

5. **Zoning by Age Group or Developmental Stage**

Differentiation of spaces for neonates, toddlers, school-aged children, and adolescents.

Adolescents may be placed in separate units with social lounges, study areas, and greater autonomy, reinforcing their developmental identity.

6. **Outdoor and Nature-Based Therapie**

Use of healing gardens, terraces, and courtyards accessible from inpatient units.

Green spaces used for both relaxation and structured therapy, supporting recovery and reducing stress.

7. **Wayfinding Through Environmental Storytelling**

Intuitive navigation via color-coding, animal or nature themes, and interactive signage that is legible to children and adults.

Consistent visual identity across departments that reduces the need for verbal directions and supports independent exploration

2.3 TECHNOLOGICAL AND ENVIRONMENTAL APPROACH OF PEDIATRIC HOSPITAL

Contemporary pediatric hospital design integrates technological innovation and environmental strategies to create spaces that are clinically efficient, emotionally supportive, and sustainable. Unlike conventional hospitals, pediatric healthcare environments demand deeper consideration of scale, sensory experience, developmental psychology, and family-centered care, all of which influence choices in structure, materials, lighting, landscape, and services. This chapter reviews key technological and environmental approaches—rooted in literature and case studies used to create pediatric hospitals that are healing, sustainable, and future-ready.

Pediatric hospitals require flexible, durable, and vibration-resistant structures to accommodate changing technologies, diverse functions, and medical equipment. The most commonly used structural systems include:

Preferred for their long spans, allowing open floor plates and flexibility in room layout.

Reduces the need for columns in clinical zones (e.g., operating theatres, ICU).

Literature supports steel's adaptability for future renovations, which are common in pediatric settings (Verderber & Fine, 2015).

Often used for vertical pediatric hospitals in urban settings due to load-bearing capacity and acoustic performance.

Concrete slabs provide stability for sensitive equipment, such as MRI and CT scanners.

Heavy thermal mass also assists with passive environmental regulation.

Growing trend in temporary or community-based pediatric units.

Fast construction time and minimal on-site disruption.

Enables quick scaling during health emergencies or regional expansions.

Pediatric materials must be non-toxic, hypoallergenic, and easily cleanable.

Antimicrobial surfaces (e.g., copper alloys, silver-ion-infused plastics) are used in high-touch zones.

Seamless flooring and rounded corners reduce infection risks and physical injury.

Soft, warm, and tactile materials (e.g., wood, cork, fabric wall panels) enhance comfort.

Bright colors and textures are used in child-appropriate areas, but care is taken to avoid overstimulation.

Literature supports multi-sensory environments tactile walls, soft floors, and sound-absorbing ceilings as therapeutic (Ulrich et al., 2018).

High-resilience finishes (e.g., vinyl flooring, resinous coatings) ensure durability.

Demountable partitions and raised floors accommodate future change without major demolition.

Lighting plays a vital role in shaping the emotional landscape of a pediatric hospital and directly impacts biological rhythms and psychological well-being.

Strong evidence links daylight exposure to faster recovery, reduced stress, and improved sleep cycles in children.

Skylights, light wells, and large glazed openings are integrated into inpatient wards, play areas, and waiting zones.

Light shelves and shading devices help manage glare and overheating.

Tunable white LED systems can mimic daylight cycles, supporting circadian regulation,

especially in wards without external windows.

Interactive lighting (color-changing LEDs, projected patterns) is used for distraction therapy, particularly in treatment rooms and imaging suites.

Lighting reinforces navigation by color-coding zones, highlighting pathways, and using low-level child-height lighting features.

Accent lighting is often paired with narrative design (e.g., underwater or jungle themes) to enhance orientation and comfort.

The use of nature and natural systems in pediatric hospitals is a well-supported environmental and therapeutic strategy.

Green walls, potted plants, and interior gardens reduce stress and improve air quality.

Low-maintenance, hypoallergenic species are preferred to avoid contamination.

Provide a retreat for patients and families, encouraging movement, distraction, and reflection.

Incorporate sensory elements (water features, textured plants, scented flowers).

Often linked to physical and occupational therapy programs.

Used in dense urban hospitals to introduce natural views and daylight access into interior-facing rooms.

These areas often serve dual roles as play spaces and therapy zones.

When direct access to vegetation is limited, hospitals use natural materials, patterned finishes, and biomorphic forms to evoke nature.

According to Kellert & Calabrese (2015), these features reduce stress and improve cognitive functioning in children.

Advanced building systems in pediatric hospitals must balance high-performance clinical operation with child safety and comfort.

Pediatric patients especially NICU and oncology patients—require strict control over temperature, humidity, and air purity.

HEPA filtration, UV sterilization, and negative pressure rooms are standard in critical care.

Displacement ventilation is preferred in wards to reduce airborne transmission.

Mechanical systems are designed to minimize noise through vibration isolation, acoustic insulation, and quiet air diffusers.

Literature shows that excessive hospital noise impairs sleep, increases stress, and negatively affects healing especially in infants (Busch-Vishniac et al., 2015).

Pediatric hospitals increasingly integrate renewable energy, green roofs, and smart building controls to reduce operational costs and environmental impact.

LEED and WELL certifications encourage designs that support child wellness, staff productivity, and environmental stewardship.

Touchless systems (for doors, sinks, elevators) to reduce germ transmission.

Bedside terminals for education, entertainment, and communication.

Real-time location systems (RTLS) for tracking equipment and ensuring patient safety.

Integrated Building Management Systems (BMS) optimize energy and service delivery in complex, 24/7 operations.

2.4 PRINCIPLES OF PEDIATRIC HOSPITAL DESIGN.

Designing a pediatric hospital goes beyond the technical requirements of a typical health care fact. according to research by the World Health Organization (WHO) and the American institute of Architects (AIA) the following principles are essential.

Child Centered Design: space must reduce fear and anxiety through colorful, interactive and friendly environments.

Family Involvement: parent and care giver accommodation must be integrated into words and waiting areas.

Safety and Accessibility: All design elements must ensure safety easy of movements and accessibility for both children and staff.

Zoning: Functional zone such as inpatient, outpatient, emergency and therapy should be clearly defined and easy to navigate.

2.5 REVIEW OF LITERATURE ON THE SUB TOPIC OF THE THESIS

Sample Literature Review: Pediatric Asthma (as an example)

1. Introduction: Pediatric asthma is one of the most common chronic respiratory disorders affecting children worldwide. It is characterized by airway inflammation, bronchial hyperresponsiveness, and reversible airflow obstruction. Understanding asthma's clinical features, pathophysiology, and management in children is crucial to reduce morbidity and improve quality of life.

2. Historical Background: The recognition of asthma as a pediatric disease dates back centuries; however, significant advances were made in the 20th century with the development of inhaled corticosteroids and bronchodilators. Early studies focused on identifying triggers and understanding the inflammatory nature of the disease.

3. Current Research Trends: Recent research has emphasized genetic predispositions, environmental influences (e.g., pollution, allergens), and immune system dysregulation. Advances in biologic therapies targeting specific inflammatory pathways (e.g., anti-IgE, anti-IL-5) have transformed management strategies, especially for severe asthma. Several clinical trials are ongoing to assess long-term safety and efficacy in pediatric populations.

4. Clinical Implications: Guidelines from organizations such as the Global Initiative for Asthma (GINA) provide frameworks for diagnosis and treatment tailored to pediatric patients. Early intervention with controller medications and patient/family education on trigger avoidance are pivotal.

5. Future Directions: Emerging areas include personalized medicine approaches, novel biomarkers for disease severity prediction, and the role of microbiome modulation. Telemedicine and digital health tools are also being explored to improve monitoring and

adherence.

6. Summary and Conclusion: Pediatric asthma remains a significant health burden, but advances in understanding its pathogenesis and treatment have improved outcomes. Continued research is necessary to address unmet needs, including prevention and management of severe cases.

CHAPTER THREE

3.0 CASE STUDY

According to JSTOR (January, 2019), a case study is about a person, group, or situation that has been studied over time. It can be defined as an intensive, systematic investigation about a person, group of people, or a unit in which the researcher examines in depth data relating to several variables. Case studies can be produced by following a formal research method. These case studies are likely to appear in formal research venues, as journals and professional conferences, rather than popular works.

OUTLINE CASE STUDY

3.1 ECWA Pediatric Hospital Egbe, Kogi State

3.2 Bowen University Pediatric Hospital, Ogbomoso Oyo State

3.3 Abby's Pediatric Hospital, Lagos, Omole Phase II

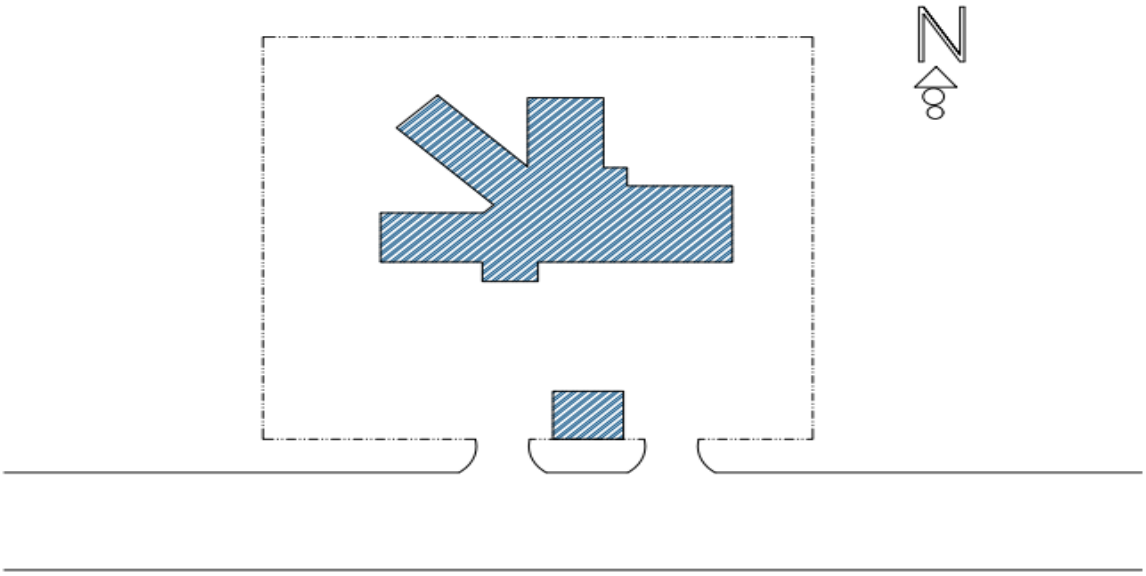
3.4 Alberta Children's Hospital in Canada

3.5 Haouptelgang Children's Hospital in Germany

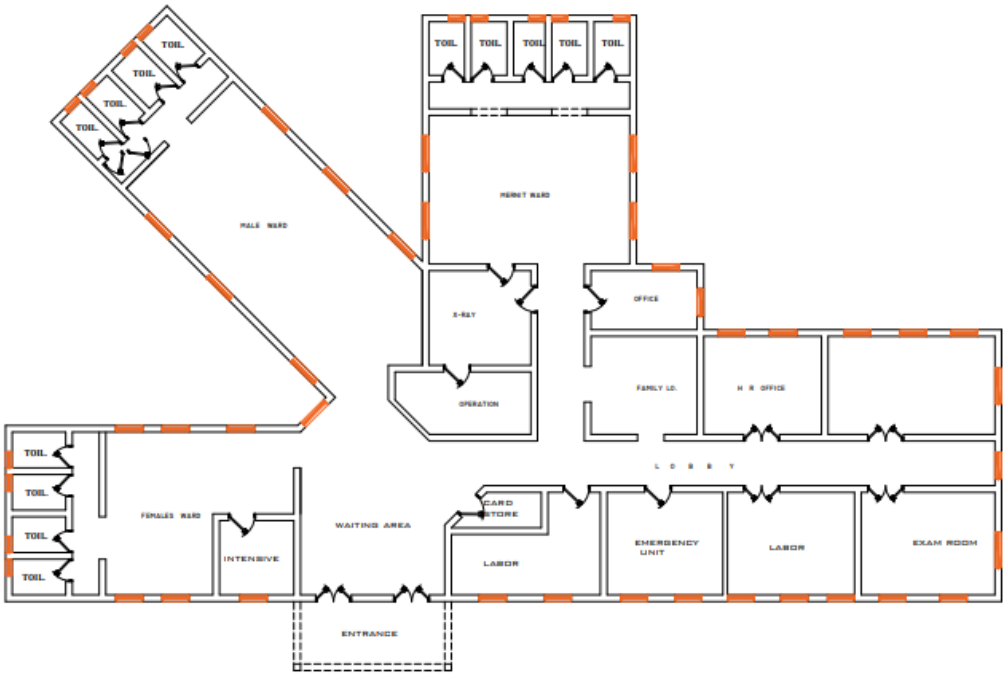
3.1 ECWA Pediatric Hospital Egbe, Kogi State

Plate 3.1 Site Map showing the ECWA Pediatric Hospital Egbe, Kogi State

Figures 3.1: Location Plan showing the ECWA Pediatric Hospital Egbe, Kogi State



Figures 3.2: Site Plan showing the ECWA Pediatric Hospital Egbe, Kogi State



Figures 3.3: Floor Plan showing the ECWA Pediatric Hospital Egbe, Kogi State

Plate 3.2: Exterior View of the Hospital of ECWA Pediatric Hospital

Egbe, Kogi State

Plate 3.3: Back Exterior View of the Hospital of ECWA Pediatric Hospital Egbe, Kogi State

Building Description

(Low-rise with Green Lawn)

Style & Form: Institutional style typical for healthcare facilities, with a single-story rectangular plan.

Facade: Plain, light-colored walls with a simple flat roof.

Entrance: Small porch or overhang above the entrance, marked clearly with signage ("Women's Ward Maternity & Pediatrics").

Surroundings: Set in a landscaped garden with neatly trimmed bushes and flowering plants, emphasizing a welcoming and peaceful environment.

Materials: Likely uses concrete or brick painted in a neutral tone, with minimal

ornamentation for functionality.

Merits

The Structure has large mass of green area

The hospital has family centered care

The hospital consider accessibility

Demerits

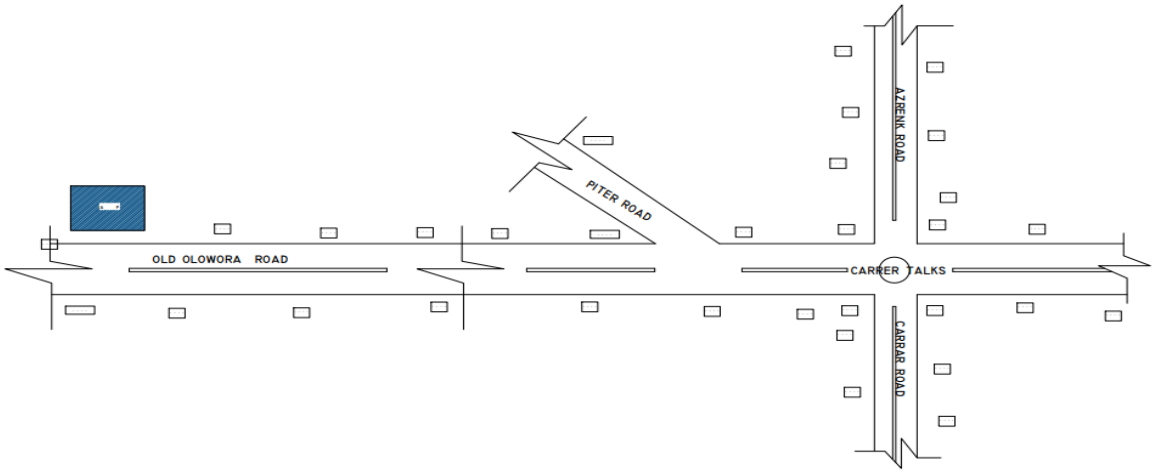
There is a shortage of pediatric unit

The building has no expansion joint

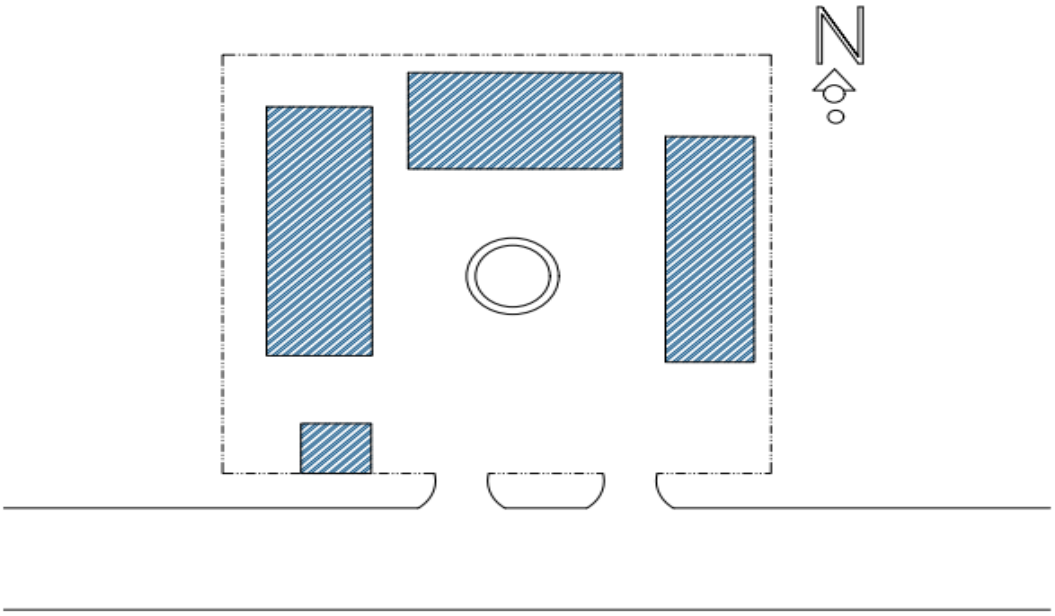
The building is not well oriented

3.2 Bowen University Pediatric Hospital, Ogbomoso Oyo State

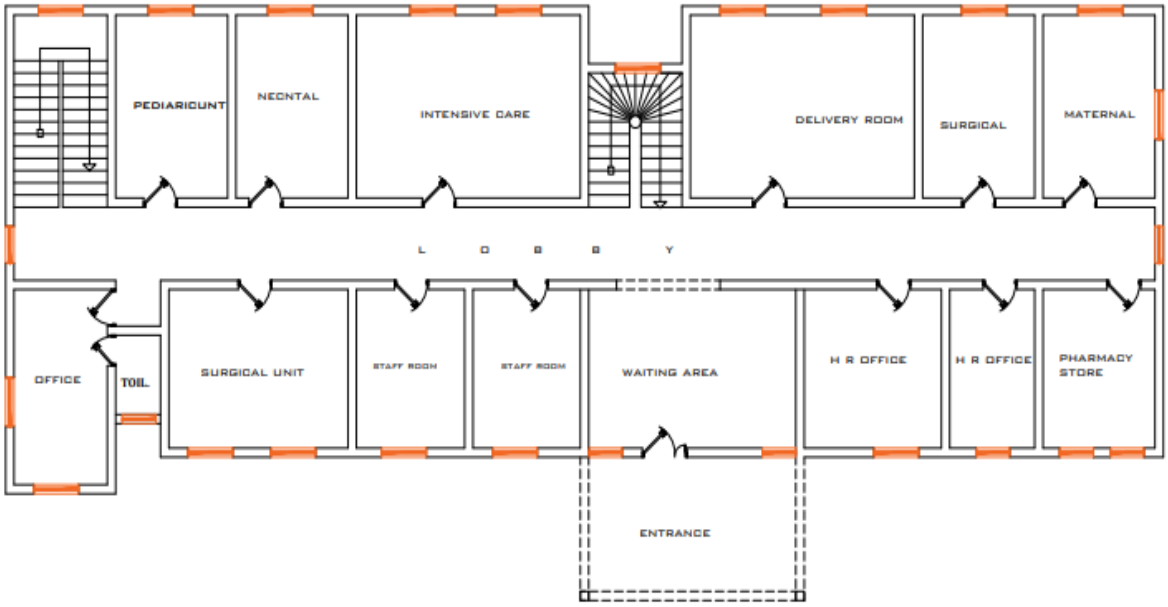
Plate 3.4: Site Map Showing Bowen University Pediatric Hospital, Ogbomoso Oyo State



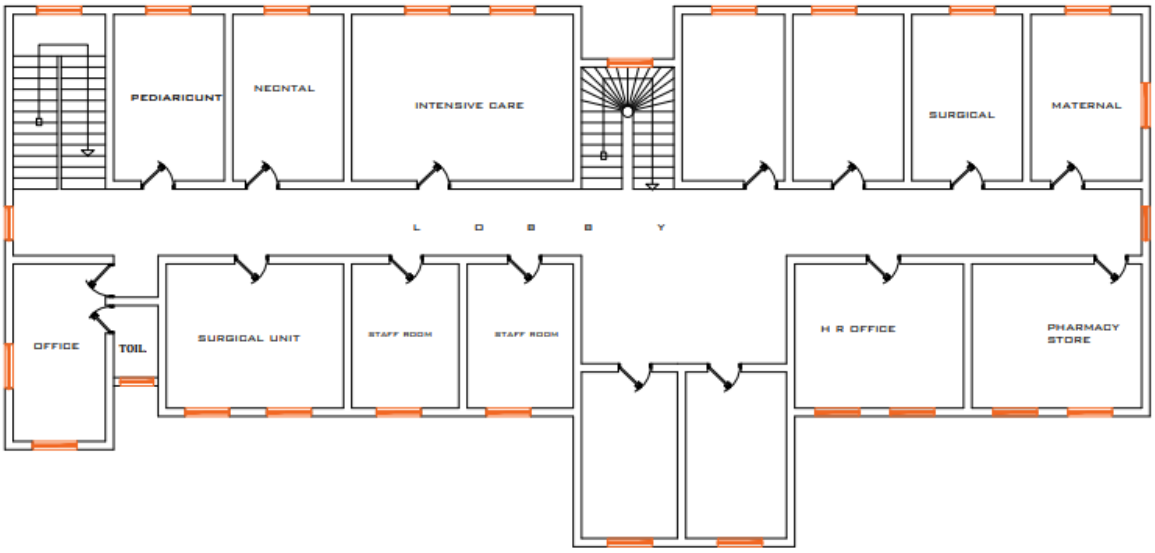
Figures 3.4: Location plan Showing Bowen University Pediatric Hospital, Ogbomoso Oyo State



Figures 3.5: Site plan Showing Bowen University Pediatric Hospital, Ogbomoso Oyo State



Figures 3.6: Ground Floor Plan Showing Bowen University Pediatric Hospital, Ogbomoso Oyo State



Figures 3.7: Upper Floor Plan Showing Bowen University Pediatric Hospital, Ogbomoso Oyo State

Plate 3.5: Exterior view of Bowen University Pediatric Hospital, Ogbomoso Oyo State

Plate 3.6: Interior view of Bowen University Pediatric Hospital, Ogbomoso, Oyo State

Plate 3.7: Interior view of Bowen University Pediatric Hospital, Ogbomoso Oyo State

Building Description of Bowen University Teaching Hospital, Ogbomoso

1. Exterior & Facade

- The building presents a **two-storey layout** with a **warm-tone rendered finish**, possibly light peach or beige, typical of institutional buildings in tropical climates.
- The **roof is pitched** with **red or terracotta roofing tiles**, lending a traditional yet tropical aesthetic, often seen in educational and healthcare buildings regionally.

2. Fenestration & Openings

- Features **regularly spaced rectangular windows**: large, multi-pane glass units framed by subtle trim.
- The **upper floor windows** on the corner portion are grouped vertically, indicating functional zoning potentially clinical rooms upstairs.

3. Form & Massing

- The building massing is **rectangular**, extending horizontally with a shallow footprint, and occupies one side of a **parking/drive area**.

- Between the building and parking, there's a **striped curb** and defined space for vehicles (seen in ground-level asphalt/tarmac).

4. Landscape & Site

- **Low hedges or shrubbery** planted along the facade serve as a landscaped buffer.
- Mature **trees** (visible behind the building) contribute to a shaded environment—important in hot, tropical climates and typical of medical campus landscaping.

5. Functional Design Considerations

- The arrangement prioritizes **accessibility**: drive-through/pickup zones, drop-off areas, visible parking, and approach paths for patients and emergency vehicles
- Window placement allows **ample natural light and ventilation**, promoting passive comfort for patients and staff.
- The design balances **aesthetic simplicity and functional durability**, aligned with hospital ergonomics and service flow principles

Quick Summary Table

Feature	**Description**
Type	Two-storey hospital/medical office building
Facade finish	Warm-toned plaster/render
Roof	Pitched red-tile
Windows	Regular rectangular openings, multi-pane
Function	Likely outpatient/pediatrics block
Site layout	Parking forecourt, landscaped strip along facade
Environmental design	Natural light, ventilation, shading elements
Design intent	Efficiency, safety, accessibility for healthcare operations

Merits

The hospital has enough space both internal and external

The hospital provides efficient flow of ventilation

The hospital considered security and aesthietics

The hospital is well oriented

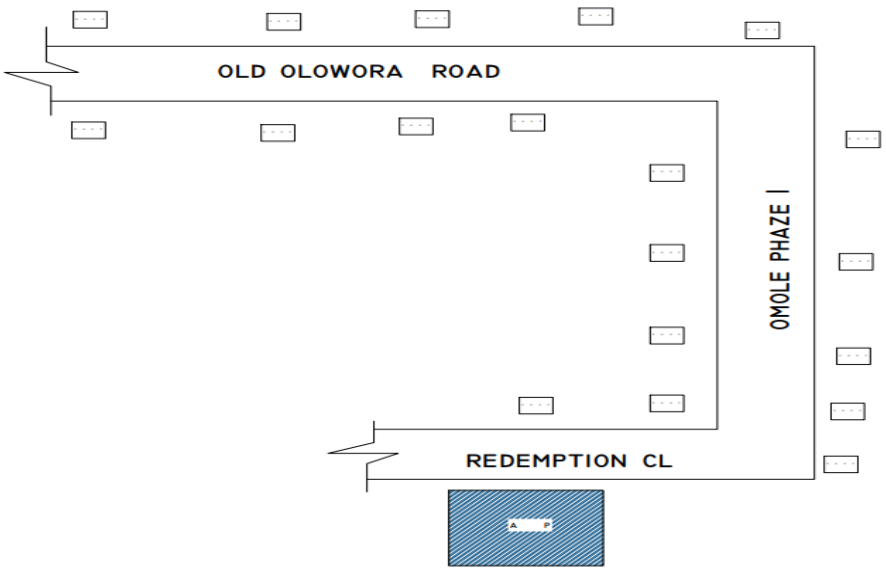
Demerits

The hospital does not provide friendly space for the kids

The safety of the kids and staff are not considered using gloss tiles in some areas

3.3 Abby's Pediatric Hospital, Lagos, Omole Phase II

Plate 3.8: Site Map showing Abby's Pediatric Hospital, Lagos, Omole Phase II



Figures 3.8: Location Plan showing Abby's Pediatric Hospital, Lagos, Omole Phase II

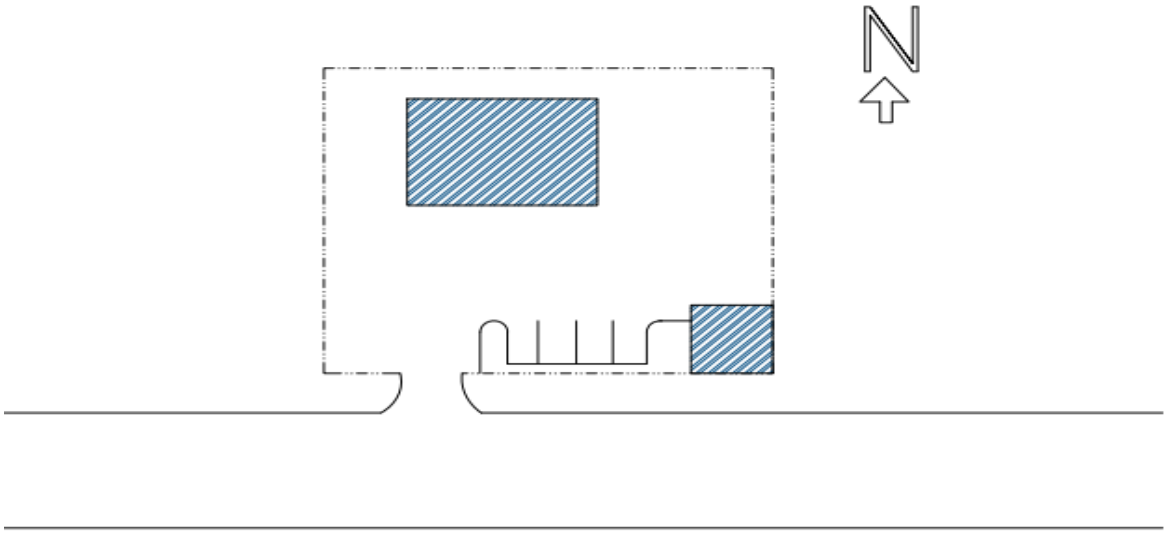
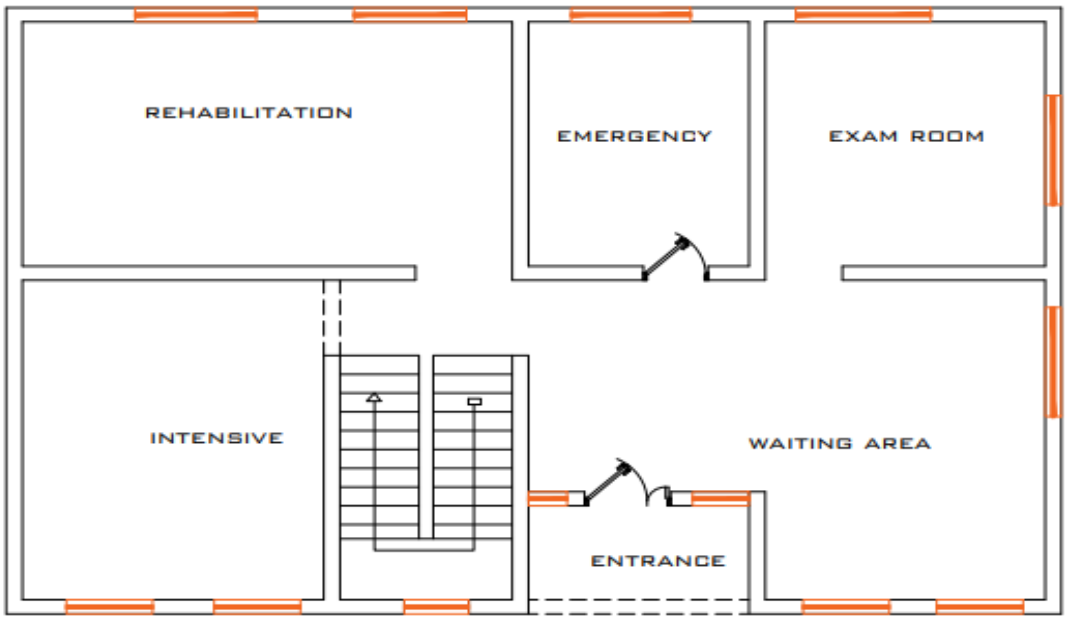
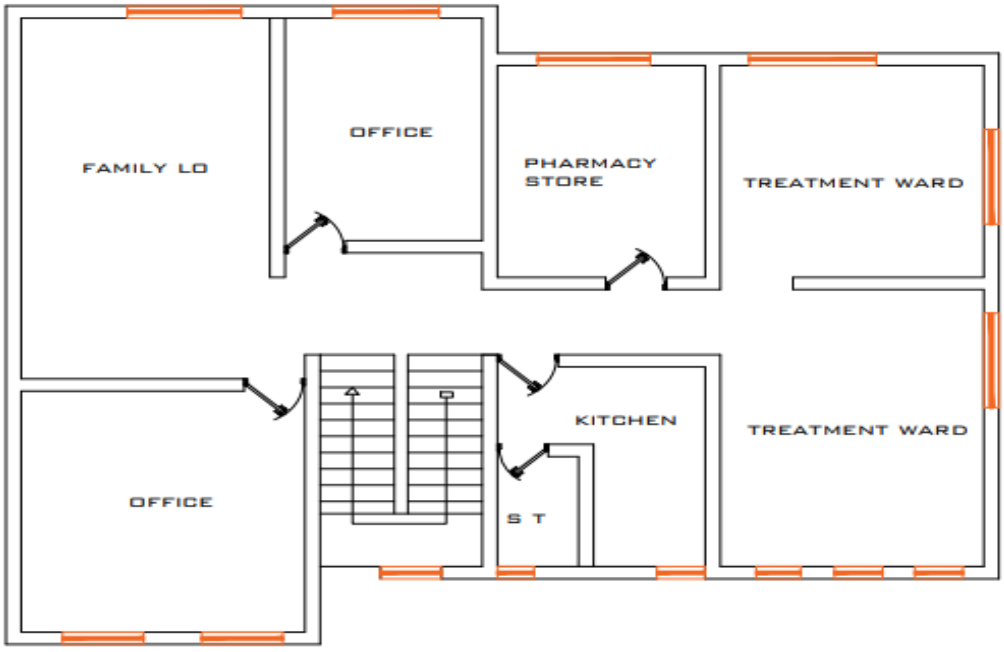


Figure 3.9: Site Plan showing Abby's Pediatric Hospital, Lagos, Omole Phase II



Figures 3.10: Upper Floor showing Abby's Pediatric Hospital, Lagos, Omole Phase II



Figures 3.11: Upper Floor showing Abby's Pediatric Hospital, Lagos, Omole Phase II

Plate 3.9: Interior view of Abby's Pediatric Hospital, Lagos, Omole Phase II

Plate 3.10: Exterior view of Abby's Pediatric Hospital, Lagos, Omole Phase II

Plate 3.11: Interior view of Abby's Pediatric Hospital, Lagos, Omole Phase II

Plate 3.12: Exterior view of Abby's Pediatric Hospital, Lagos, Omole Phase II

Building Description

Façade & Shape

- The exterior is finished in a soft, warm-toned plaster or painted render possibly light peach or beige highlighting a clean yet inviting aesthetic.
- A gently sloping red-tiled roof with modest eaves suggests a Mediterranean or colonial influence.

Windows & Openings

- The most striking elements are the two **tall arched windows** on the ground level—each composed of a rectangular lower section topped with a semi-circular arch. These arches are subdivided with radial muntin, creating a sunray effect at the apex.
- Above, set into a plane under the roofline, is a smaller **rectangular double window**, likely serving a second-floor room.

Materials & Trim

- The window frames appear to be timber or wood-look (or possibly metal), painted in a warm contrast color likely brown or dark tone—to complement the warm wall finish.
- Trim around windows is subtly highlighted with slightly deeper or more refined material, framing the glass and offering visual depth.

Functional Details

- An exterior wall-mounted **air conditioning unit** on the upper level suggests climate control for the second floor.
- Adjacent to the ground-floor entry point (off-frame) there's a van parked next to a **striped black-and-white painted curb**, commonly found in organized parking spaces.

Landscape & Surroundings

- Near the base of the façade, there are **ornamental shrubs or potted plants**, adding greenery and softening the hard edge of the drive or walkway area.
- The paving is smooth, likely asphalt or tarmac, with well-defined parking demarcations.

Style & Functional Interpretation

This building combines **Mediterranean** styling—evident in the arched windows and red tile roofing with practical features typical of **modern tropical architecture**, such as the air conditioning unit and paved parking. The design emphasizes both form and comfort: arched windows offer elegance and natural light, while the plaster finish and roof tiles signal regional adaptation to warm climates.

Given the scale and detailing, it could serve as:

- A **private home** with an upper level perhaps bedrooms.
- A **small professional office** or guesthouse, providing a welcoming façade and functional interior spaces.

Summary Table

Feature	**Description**
Exterior finish	Light warm plaster/paint rendering
Roof	Red ceramic tile, sloped
Main windows	Tall framed arches with divided panes
Upper window	Rectangular double frame
Climatic feature	Wall-mounted AC unit
Landscaping	Small shrubs in front
Parking	Asphalt drive with painted curb

Merits

The Hospital is designed to be welcoming for anxiety children, design with decor and play areas that reduce anxiety

The hospital has large size window which give efficient ventilation to the children and staff

Demerits

The hospital has limit access of unit needed in pediatric care

The hospital has capacity challenges that lead to overcrowding

3.4 Alberta Children's Hospital in Canada

Figures 3.12: Site Map Alberta Children's Hospital in Canada

Plate 3.13: Exterior view Alberta Children's Hospital in Canada

Plate 3.14: Exterior view Alberta Children's Hospital in Canada

Plate 3.15: Interior view Alberta Children's Hospital in Canada

Plate 3.16: Interior view Alberta Children's Hospital in Canada

Building Description

(Colorful Children's Hospital):

Style & Form: Modern, child-friendly design with playful use of shapes and bright colors.

Facade: Large glass windows combined with colorful paneling in blue, yellow, orange, and

white.

Design Elements: Rounded corner and mixed geometric shapes add a soft, inviting feel appropriate for a children's hospital.

Materials: Extensive use of glass for natural light, along with metal or composite panels for color and texture.

Signage: Clear, bold signage integrated into the building's facade.

Merits

The hospital has a playful exterior view that reduces anxiety for children

The hospital has a bollard for securing pedestrians from motion accident

The hospital is well oriented

The hospital as security conscious

Demerits

The hospital does not have enough green areas

The hospital lacks enough play area

3.5 Haouptelgang Children's Hospital in Germany

Figures 3.13: Site Map Haouptelgang Children's Hospital in Germany

Plate 3.17: Exterior view of Haouptelgang Children's Hospital in Germany

Plate 3.18 Interior view of Haouptelgang Children's Hospital in Germany

Plate 3.19: Exterior night view of Haouptelgang Children's Hospital in Germany

Building Description

(Colorful Multi-Story Building):

Style & Form: Modernist architecture with a functional, rectangular multi-story form.

Facade: Features a vibrant, colorful facade with horizontal bands in red, yellow, blue, and white, likely using panels or painted concrete.

Windows: Regularly spaced windows arranged in rows, maintaining symmetry and rhythm.

Materials: Possibly uses concrete or steel structure with glass windows and colored cladding.

Design Elements: The bright colors add an artistic and dynamic touch to an otherwise straightforward block structure. The building emphasizes horizontal lines.

Merits

The hospital has a large space

The hospital has good exterior view

The hospital has a good usage of composite structure

The hospital is well oriented

The hospital is well lighted during the night hours

Demerits

The hospital lacks green areas

The hospital lack friendly approach

CHAPTER FOUR

4.0 INTRODUCTION/ STUDY AREA PROJECT SITE

Located in the Life Camp district of the Federal Capital Territory, Abuja, Bellavue Estate is a well-planned residential community known for its serene environment, green landscapes, modern infrastructure, and 24/7 security. This makes it a preferred neighborhood among upper-middle-class families and professionals is a fast-growing residential and institutional area located in the Jabi District, known for its strategic location, serene environment, and increasing infrastructure development.

Rationale for Site Selection: The choice of Zainab Gobir Street as the site for the proposed pediatric hospital is informed by a combination of urban planning suitability, accessibility, demographic need, and environmental factors

4.1 SITE LOCATION

The site is located at Zainab Gobir Street, life camp, Abuja

4.2 SITE LOCATION MAP

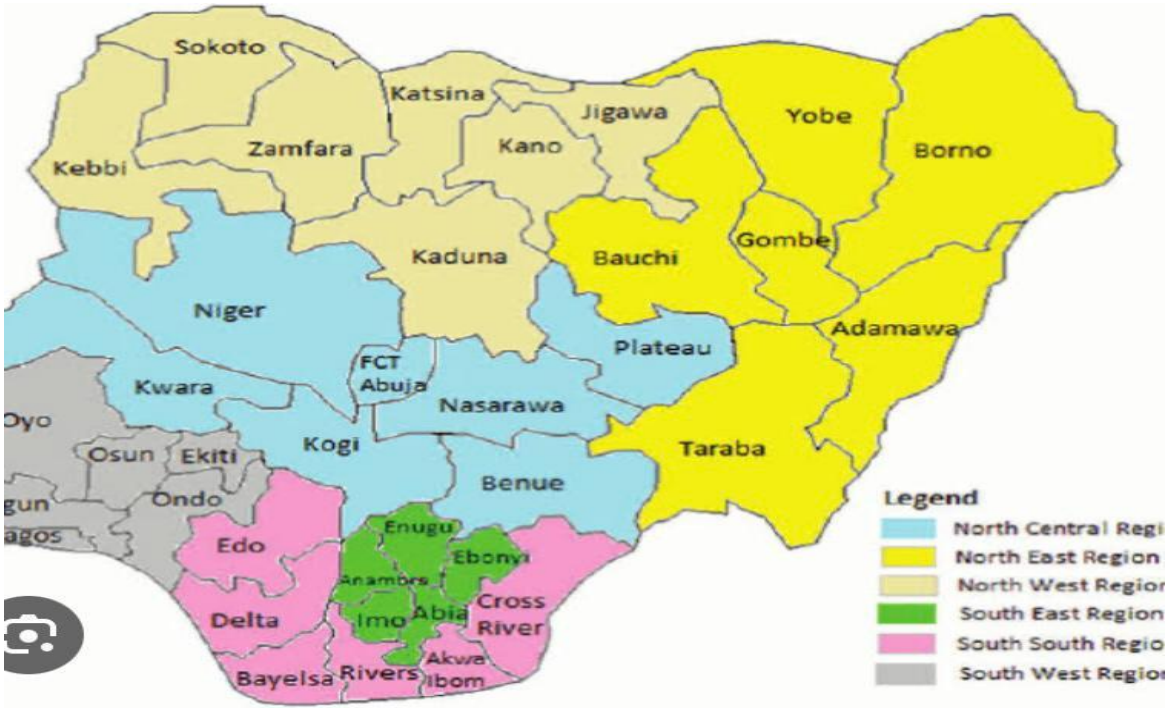


Plate 4.1: Google Map showing, Abuja

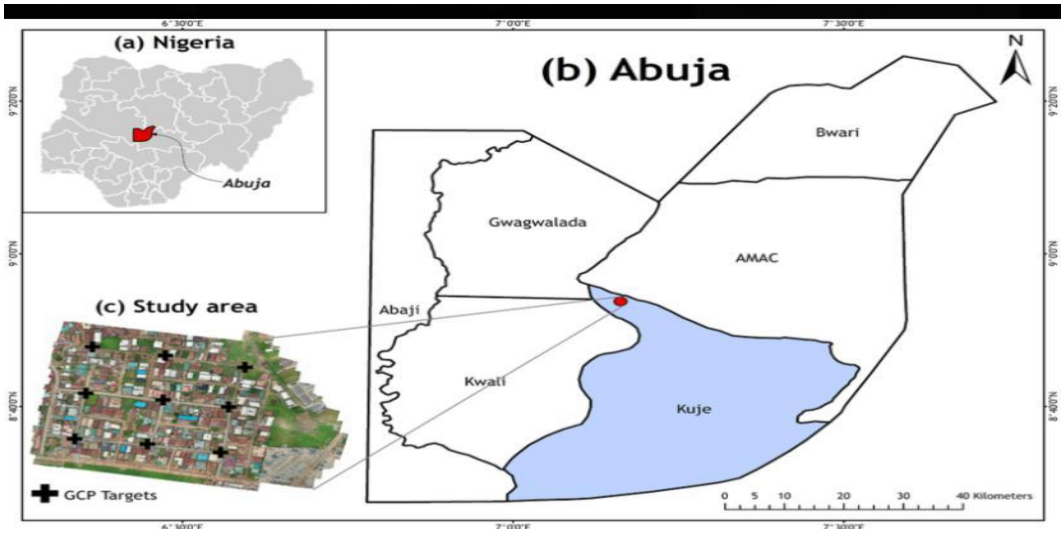


Plate 4.2: Site Location Map the Proposed Pediatric Hospital

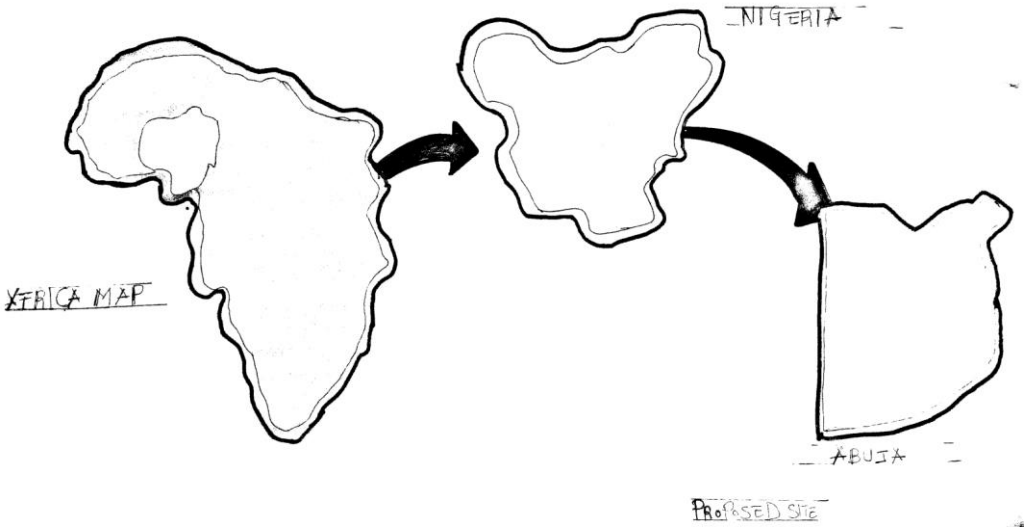


Plate 4.3: Site Location Map the Proposed Pediatric Hospital

Plate 4.4: Google Location Map Study Area

4.3 Site Characteristics

Plate 4.5: Google Map of the Proposed Pediatric Hospital

1. Location & Accessibility

Proximity to main roads for ease of ambulance/vehicle access.

Connection to public transit and major arterial routes for patients, staff, and supplies.

Vehicular circulation zones: separate entry/exit routes for ambulances, staff, and visitors.

2. Site Area & Zoning

Parcel size sufficient for:

Main hospital facility,

Car parking (staff, visitors, ambulance),

Future expansion,

Supporting utilities (power, water, sewage).

Compliance with local zoning laws (residential-healthcare mix corridors in Life Camp).

3. Topography & Soil

Level or gently sloping land conducive to construction.

Good drainage; no flood-prone zones.

Geotechnical suitability for foundational works and utilities.

4. Utilities & Services

Reliable connection to mains water, sanitation/sewage, and electricity (preferably with backup generator).

Potential for solar or green energy integration given residential-estate sensitivities.

ICT infrastructure: connectivity for telemedicine, hospital info systems.

5. Climate & Environment

Building positioned for natural ventilation and daylighting (particularly for wards and circulation areas)

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Landscaping buffer zones (trees, gardens) to reduce noise, ensure patient comfort, and fit residential setting.

6. Functional Zoning

Separate zones for:

Outpatient clinics,

Emergency and ambulatory care,

Inpatient wards (neonatal, pediatric),

Laboratories, pharmacy, staff support spaces, plus administrative offices.

Patient/visitor circulation paths clearly separated from staff and service zones.

7. Safety & Security

Secure perimeter fencing, monitored access points.

Space for ambulance turnaround and drop-off bays.

Emergency access routes, egress in disaster scenarios.

8. Expansion Capacity

Reserved land or modular layout to allow future expansion: e.g., new wards, ICU, diagnostic center, parking.

9. Support Facilities

Staff accommodations or restrooms, break rooms.

Service yards/loading zones for supplies and waste management.

Power backup, water storage, waste treatment facilities, ideally integrated within building zones to minimize disturbance.

10. Community Integration

Consideration for minimizing disturbance to the surrounding residential community (e.g., noise control, scheduled traffic flow).

Possible integration of public health outreach or educational center serving Life Camp and surrounding areas.

4.4 Site Analysis/ Inventory

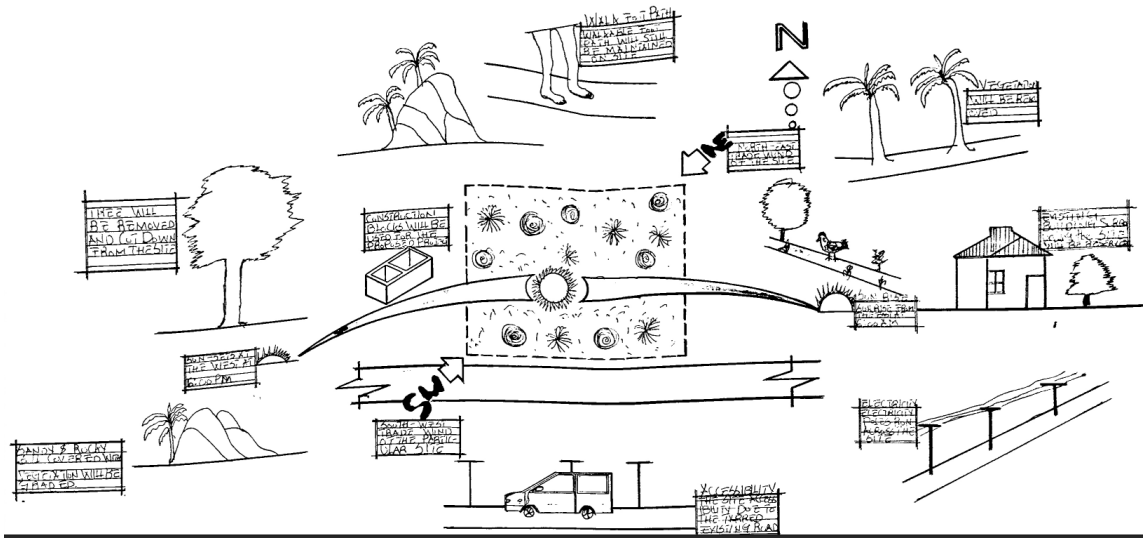


Plate 4.6: Site Analysis of the Proposed Pediatric Hospital

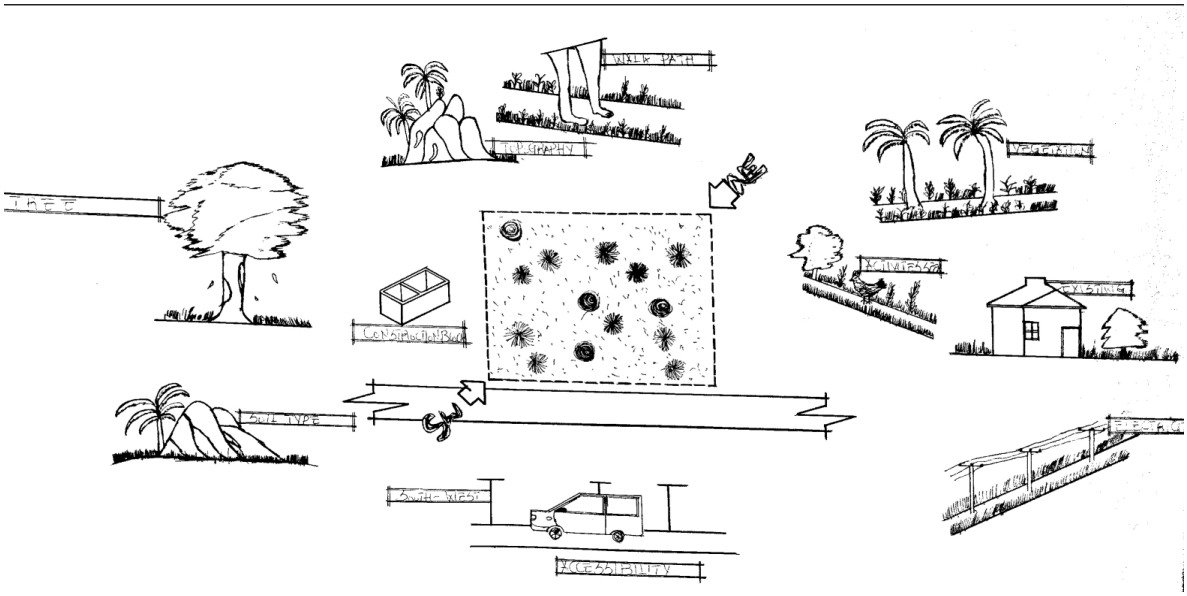


Plate 4.7: Site Analysis the Proposed Pediatric Hospital

4.5 Geographical / Climatic data

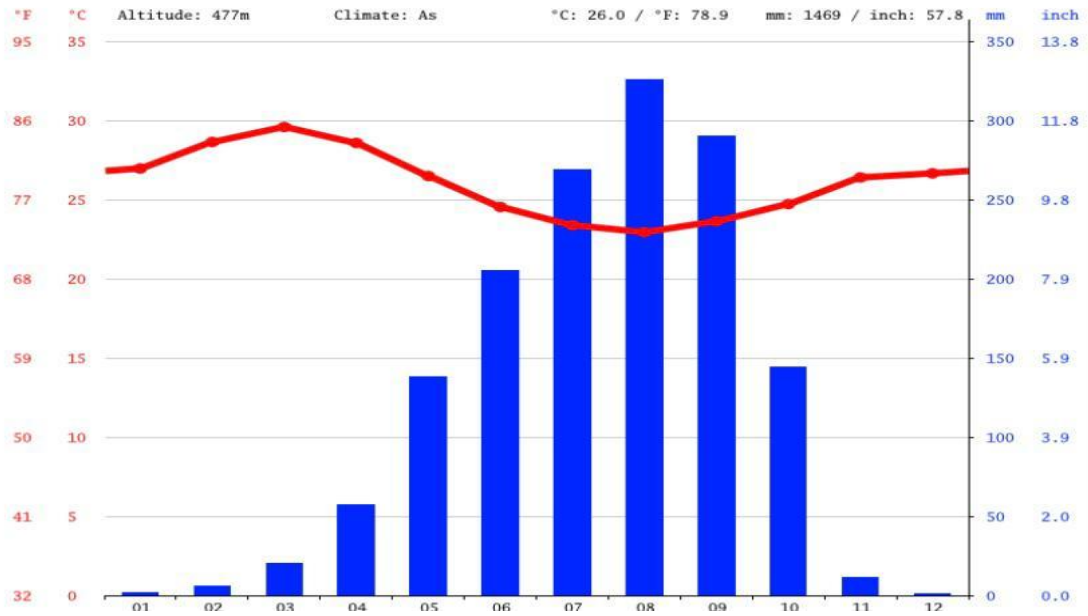


Plate 4.8: Climatic Showing the chart of Abuja

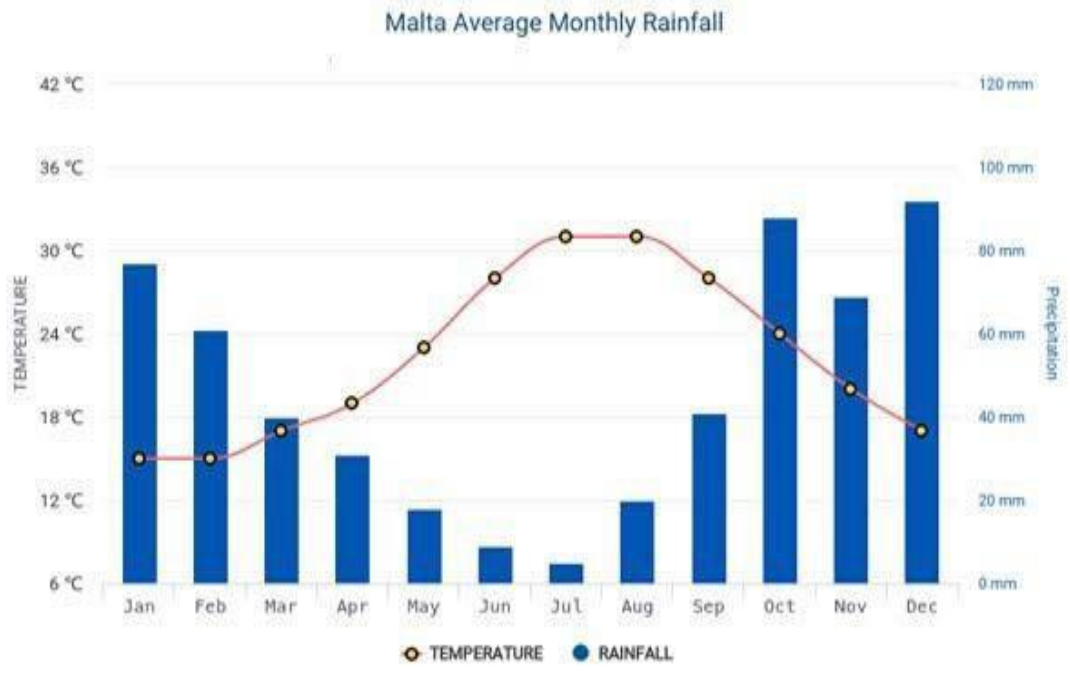


Plate 4.9: Climatic Showing the amount of rainfall

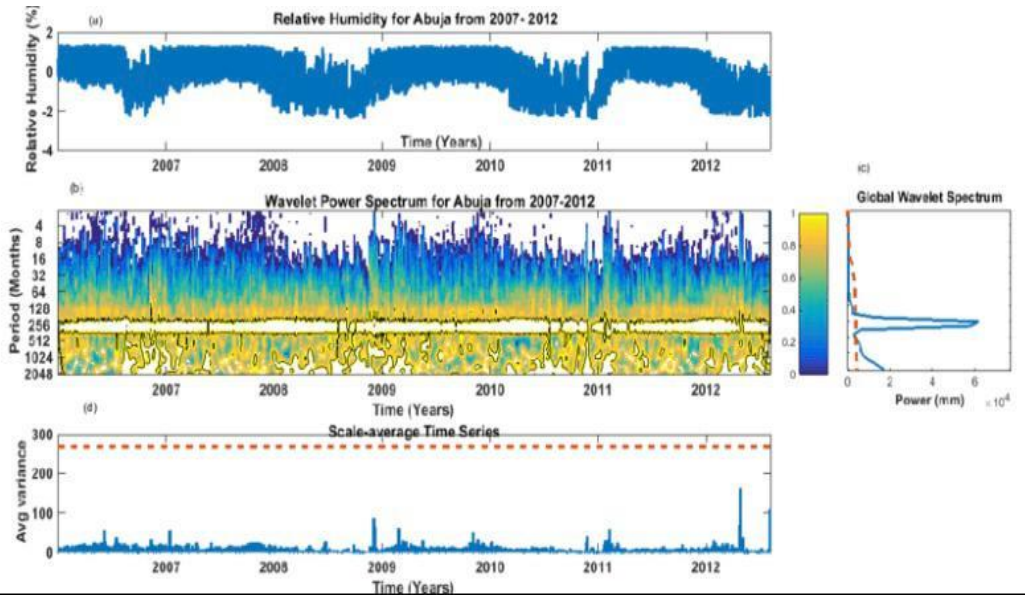


Plate 4.10: Climatic Showing the Humidity Chart in Abuja

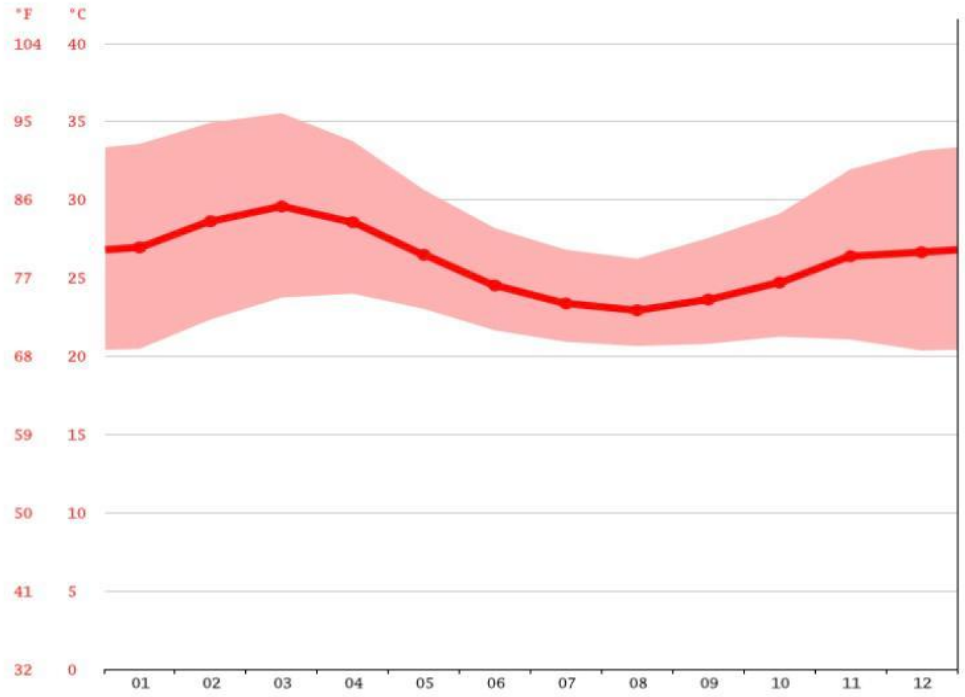


Plate 4.11: Climatic Showing the Sun Shine Chart in Abuja

4.6 Analysis of the Immediate Environmental Conditions of the site

1. Location & Site Context

Neighborhood context: Life Camp is a quiet, well-planned, secure, residential district in Phase 3 of Abuja, known for its leafy streets, modern infrastructure, and proximity to upscale communities, parks, and recreational areas

Zainab Gobir Street lies within this residential setting likely surrounded by medium-density housing, estates, and with access to utilities on paved roads

2. Terrain, Topography & Soil

Elevation & terrain: Life Camp sits on gently undulating land approximately 320–380 m above sea level, with moderate slopes that support natural drainage

Soil characteristics: In the broader FCT region, soils are derived from Migmatite-gneiss and granite parent rock. Typically, sandy-clay loams offer good load-bearing but require proper erosion control where slopes are present

3. Climate & Hydrology

Climate type: Tropical tropical wet-and-dry (Köppen Aw), with wet season April–October and dry season including Harmattan dust (Nov–Mar)

Rainfall & drainage: Peak rainfall occurs June-September (200–250 mm/month). The terrain's slope should enable runoff, but ensure local swales and drains are integrated to avoid waterlogging in low-lying spots.

Flood risk: There is no record of major flooding in Life Camp, unlike some fringe neighborhoods like Lugbe where poor planning has caused flooding issues

4. Land Cover & Vegetation

Vegetation: Life Camp features savanna vegetation—grass, shrubs, scattered native trees (e.g., neem, acacia). Mature shade trees are common in many estates and along streets, contributing to the green urban character.

Land use: Predominantly residential plots, some open undeveloped land, pocket gardens, and landscaped communal spaces.

5. Infrastructure & Utilities

Road Access & Connectivity: Zainab Gobir Street is likely served by well-paved internal roads connecting to Ring Road 2 and Obafemi Awolowo Way—providing easy access to Jabi Mall, Gwarinpa, and central Abuja

Electricity: Residents report generally stable supply in Life Camp, with few disruptions aside from broader grid issues impacting Abuja at large – one user rated electricity at approximately

Connectivity: Internet quality is mixed in parts of Life Camp (e.g. EFAB estate); providers like Airtel or Legend Network are preferred to MTN by many locals

Water & Sewage: Utility access like borehole water, piped supply, and sewage systems are typically within 300–500 m, as served across the district's estates

6. Environmental Sensitivities & Risks

Air quality: Generally good, but seasonal exposure to Harmattan dust during late dry season is expected.

Noise: Low ambient noise residential setting not impacted by major industrial or highway noise sources.

Biodiversity/habitat: Minimal sensitivity—no official forest or wetlands near Life Camp; patchy savannah vegetation has low ecological risk.

Health concerns: Unlike Lugbe, where illegal construction and waste burning affect air quality and health, Life Camp is well-managed with minimal pollution or unmanaged waste activitie.

4.7 DESIGN CRITERIA

The proposed pediatric hospital at Zainab Gobir Street should combine child-centered care, sustainable climate-responsiveness, and efficient functional zoning. Given the peaceful residential setting in Life Camp and access to infrastructure, it is ideal for a medium-sized

pediatric facility with outpatient, emergency, and inpatient capabilities.

4.8 DESIGN CONCEPT

The design approach was based on functionalism, which is an architectural principle that says that building should be design based solely on purposed and function of the building.

4.9 PROJECT GOALS

To establish and operate a state-of-the-art pediatric hospital that delivers comprehensive, family-centered medical care to children from birth through adolescence, while promoting child health through innovation, education, research, and community outreach.

4.10 Schedule of Accommodation

S/n	Requirement Unit	Length	Width	Area	No.
1.	Entrance	4,800mm	2,100mm	10,080,00mm^2	1
2.	Waiting area	8,200mm	6,000mm	49,200,00mm^2	1
3.	Card room	3,000mm	2,100mm	6,300mm^2	1
4.	Injection room	3,000mm	2,100mm	6,300mm^2	1
5.	Pharmacy	4,200mm	3,000mm	12,600mm^2	1
6.	Consulting room	3,000mm	3,000mm	9,000mm^2	2
7.	Toilet	1,500mm	1,200mm	1,800mm^2	7
8.	X-ray room	3,000mm	3000mm	9,000mm^2	1
9.	Operation room	5,200mm	1,500mm	7,800mm^2	1
10.	Dark room	2,100mm	1,900mm	3,990mm^2	1
11.	Sterilization room	2,100mm	1,900mm	3,990mm^2	1
12.	Nurse station	3,000mm	2,400mm	7,200mm^2	1
13.	Family waiting area	5,500mm	3,000mm	16,500mm^2	1
14.	Laboratory	3,000mm	3,000mm	9,000mm^2	1
15.	Emergency unit	10,600mm	6,900mm	73,140,00mm^2	1
16.	General ward	7,800mm	6,000mm	46,800,00mm^2	2
17.	Private ward	4,200mm	2,800mm	11,760,00mm^2	2
18.	Nurse station	4,000mm	2,500mm	10,000mm^2	1
19.	Laundry	2,800mm	1,600mm	4,480mm^2	1
20.	Toilet	1,500mm	1,000mm	1,500,000mm^2	6
21.	Waiting area	10,500mm	1,700mm	17,850mm^2	1
22.	Exit	7,000mm	1,200mm	8,400,00mm^2	1

Table 4.1: Showing Schedule of Accommodation of the Proposed Pediatric Hospital

4.11 Functional Relationship

Clinical Functions

These are the core medical services that deliver direct patient care.

a. Emergency Department (ED)

Immediate treatment for acute and critical conditions.

Strong relationship with radiology, laboratory, PICU (Pediatric Intensive Care Unit), and inpatient units.

b. Inpatient Units

Pediatric general medicine, PICU, NICU (Neonatal Intensive Care), and surgical units.

Linked to pharmacy, lab, radiology, and rehabilitation services.

c. Outpatient Clinics

Preventive care, specialty consults (e.g., cardiology, endocrinology).

Coordination with lab, imaging, and pharmacy.

d. Surgical Services

Pre-op and post-op care linked to recovery areas, anesthesia, and sterile processing departments.

Diagnostic & Treatment Support

Support accurate diagnosis and treatment.

a. Imaging/Radiology

CT, MRI, X-ray, ultrasound services.

Direct communication with ED, inpatient and outpatient departments.

b. Laboratory Services

Bloodwork, pathology, microbiology.

Continuous interaction with nearly all clinical departments.

c. Pharmacy

Prepares and dispenses medications.

Integrated with inpatient units, ED, ICU, and outpatient areas.

Family and Patient Support Services

Focus on emotional, developmental, and logistical support.

a. Child Life Services

Help children cope with hospitalization through play, education, and support.

Collaborate with nursing, physicians, and rehab teams.

b. Social Work and Counseling

Psychosocial support, discharge planning, family services.

Linked with care teams and community services.

c. Pastoral Care and Spiritual Services

Emotional and spiritual support for families and staff.

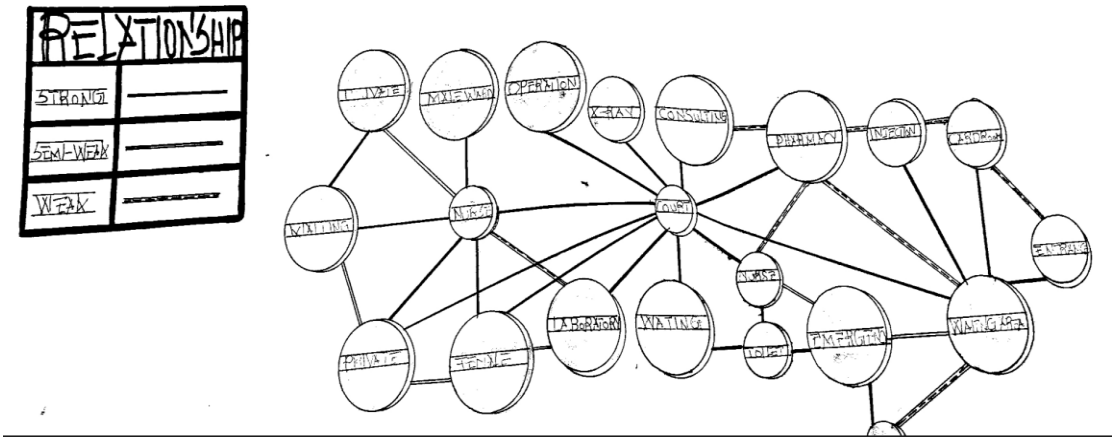
Operational and Administrative Functions

Ensure the hospital runs smoothly.

a. Admissions and Registration

Connects with ED, clinics, and inpatient services.

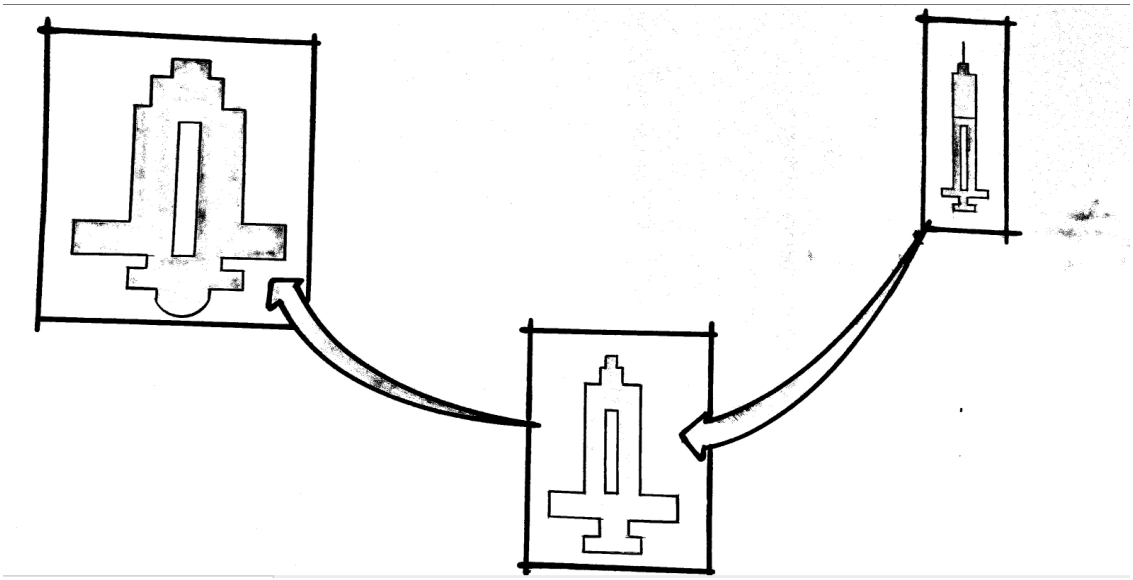
b. Medical Records & Health Information Management



Figures 4.1: Functional Relationship

4.12 Conceptual Development

The conceptual development of a pediatric hospital involves creating a comprehensive vision that integrates healthcare needs, child-centric design, family involvement, and operational functionality. It's a multidisciplinary process that combines medical planning, architecture, child psychology, and community engagement.



Figures 4.2: Conceptual Development

CHAPTER FIVE

5.1 APPROACH TO THE DESIGN IDEAS/CONCEPTS

The design approach for the pediatric hospital focuses on creating a healing, child-friendly environment that reduces anxiety and supports recovery. Key principles include biophilic design, accessibility, sustainability, and cultural responsiveness. The design emphasizes natural light, vibrant colors, intuitive wayfinding, and interactive spaces to enhance the child's and caregiver's experience.

5.2 DESIGN CONCEPT

The core concept is a "Healing Garden Hospital"—a hospital integrated with nature and play. Inspired by a child's journey, the layout incorporates curved pathways, colorful facades, and open courtyards. Zones are color-coded for intuitive navigation and each department is designed to resemble a "mini-village," making the space less intimidating.

5.3 CONSTRUCTION METHODS

The project uses a hybrid construction method: reinforced concrete frames for structural integrity and prefabricated panels for speed and cost-efficiency. Sustainable construction practices are prioritized, including the use of low-VOC materials and waste reduction strategies.

5.4 SUB-STRUCTURE

The sub-structure comprises strip and raft foundations, considering soil conditions and load distribution. Basement spaces are allocated for parking, medical gas systems, and utilities. Damp-proofing and proper drainage systems are integrated to prevent water ingress.

5.5 SUPER-STRUCTURE

The superstructure includes RCC columns and beams with infill walls. Roof structures incorporate steel trusses and insulated panels for thermal control. Atriums with skylights are integrated to enhance natural lighting. Façade treatments include child-friendly murals and sun-

shading devices.

5.6 CONSTRUCTION MATERIALS

Structural: Reinforced concrete, steel.

Walls: Concrete blocks, gypsum board partitions.

Finishes: Anti-bacterial vinyl flooring, washable paints, acoustic ceilings.

Windows: Double-glazed aluminum frames.

Roofing: Corrugated insulated panels with solar integration.

Materials are selected for durability, hygiene, and ease of maintenance in a pediatric setting.

5.7 SUB-STRUCTURE & SUPER-STRUCTURE INTEGRATION

Efficient vertical circulation cores (elevators, ramps, stairs) link the sub- and super-structures. Service shafts run through both structures to accommodate plumbing, HVAC, and electrical systems, ensuring functional coherence.

5.8 SERVICES INFRASTRUCTURE

The design accommodates modern MEP (Mechanical, Electrical, Plumbing) services:

HVAC: Zonal air-conditioning for energy efficiency.

Electrical: Backup generators and solar panels.

Water Supply: Borehole and treatment system with overhead tanks.

Medical Gases: Centralized oxygen and suction systems.

ICT: Nurse call systems, CCTV, and Wi-Fi.

Waste Management: Segregated medical waste zones and incineration area.

5.9 DESIGN CONTRIBUTION

This project contributes to the healthcare design landscape by integrating child psychology, sustainability, and local cultural identity. It showcases how architecture can play a critical role in healing and well-being, particularly for vulnerable populations like children.

5.10 INTRODUCTION

The concluding chapter summarizes the project's relevance, vision, and how the design addresses the challenges in pediatric healthcare environments. It re-emphasizes the importance of architectural empathy in medical spaces.

5.11 RECOMMENDATIONS

Consider phased construction to minimize initial capital expenditure.

Include a post-occupancy evaluation to improve future designs.

Collaborate with pediatricians and child psychologists during design development.

Use flexible spaces that can adapt to future healthcare technology.

5.12 CONCLUSION

The design and planning of the proposed pediatric hospital reflect a deep commitment to child-centered care through thoughtful architectural solutions. From the conceptual stage to the integration of services and construction strategies, every aspect of the design aims to create a safe, healing, and welcoming environment tailored specifically for children, their families, and healthcare providers.

The design approach integrates functionality with compassion, using vibrant, engaging spaces and intuitive circulation to reduce the stress often associated with hospital visits. The "Healing Garden" concept not only enhances patient recovery but also encourages emotional comfort through biophilic and playful elements.

Structurally, the hospital relies on durable and sustainable materials, with a hybrid construction method to ensure both stability and efficiency. The clear delineation between sub-structure and super-structure allows for a well-organized vertical system that supports essential hospital infrastructure and services.

Incorporating modern services infrastructure including HVAC, medical gas systems, solar power, and ICT networks ensures the hospital meets current healthcare standards while

remaining future-ready. Moreover, the design reflects the importance of sustainability and operational efficiency without compromising patient comfort or clinical functionality.

Ultimately, this project makes a significant contribution to pediatric healthcare architecture by merging aesthetic, technical, and human-centered design principles. It sets a benchmark for how hospitals can be reimagined not just as places of treatment, but as nurturing spaces for growth, recovery, and holistic well-being.

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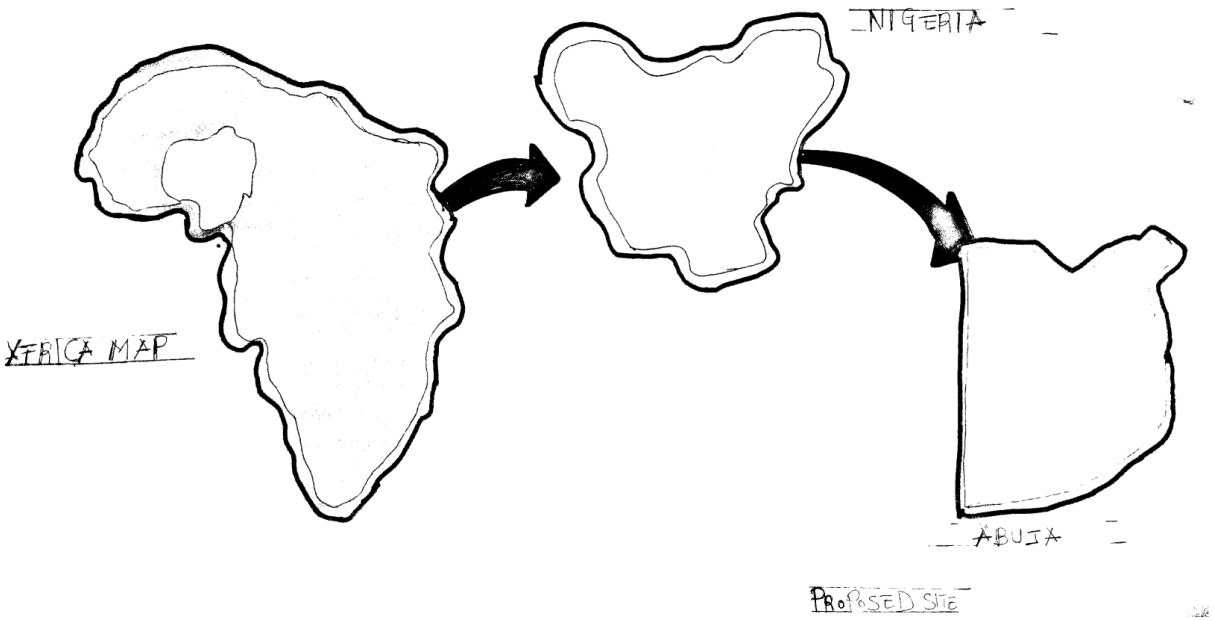
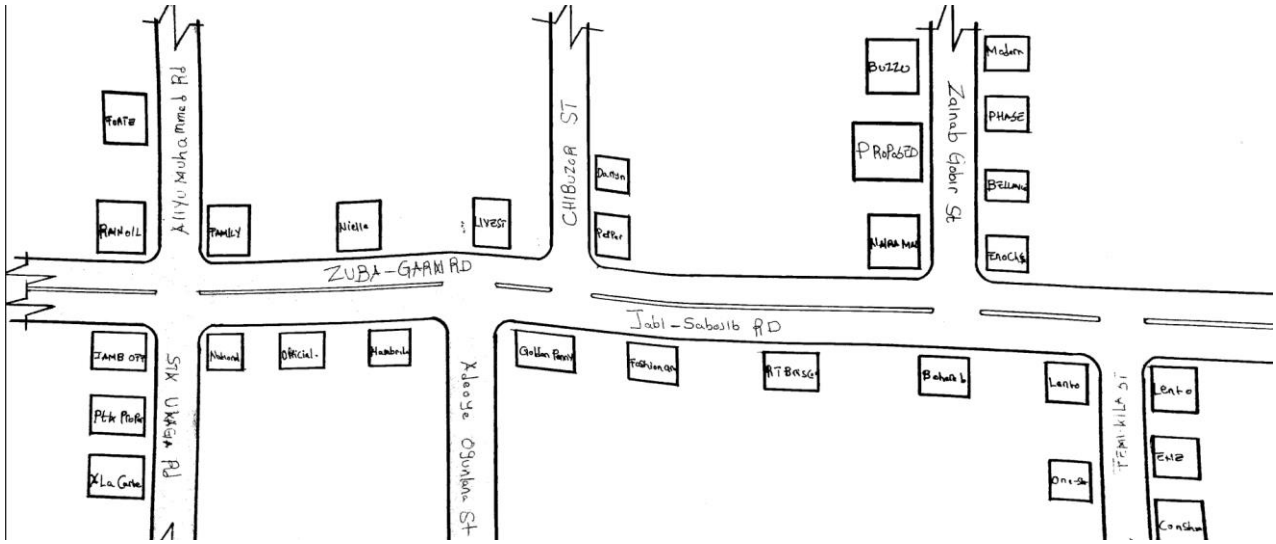
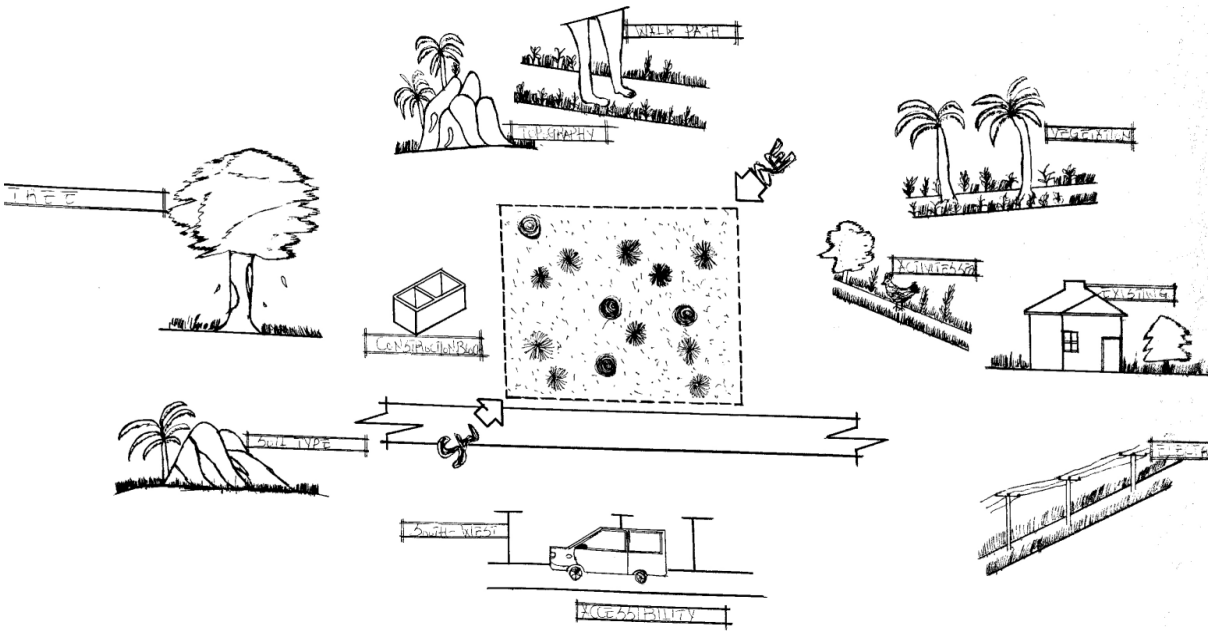
Appendix



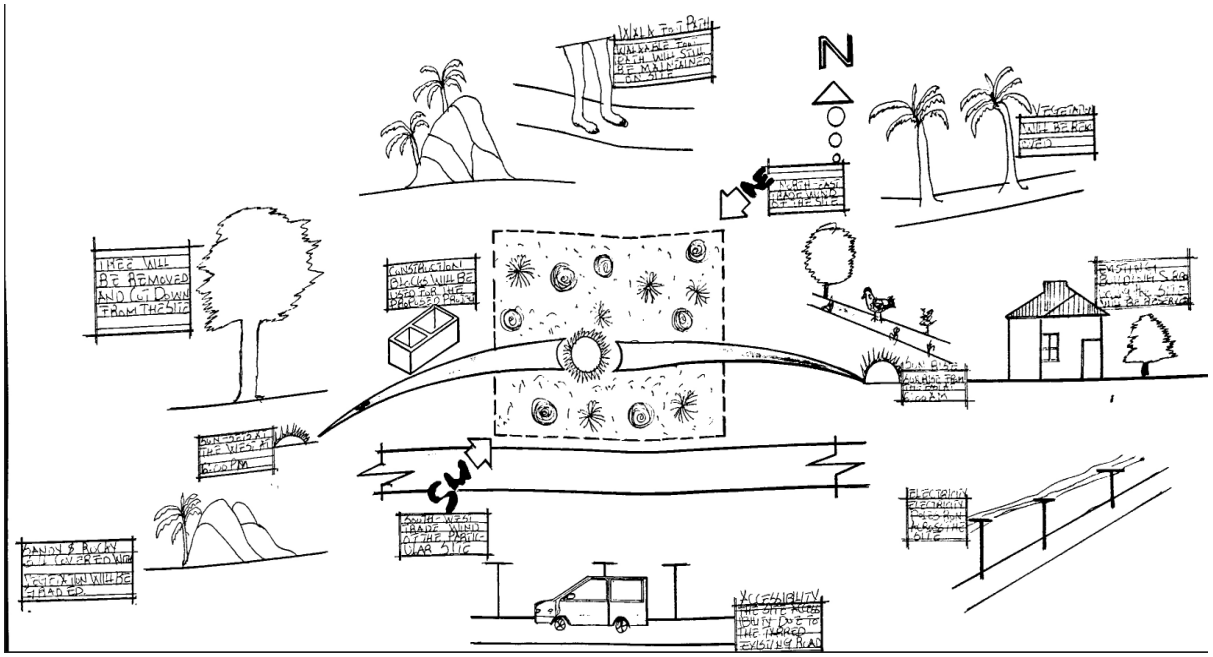
Appendix 5.1: Location Map



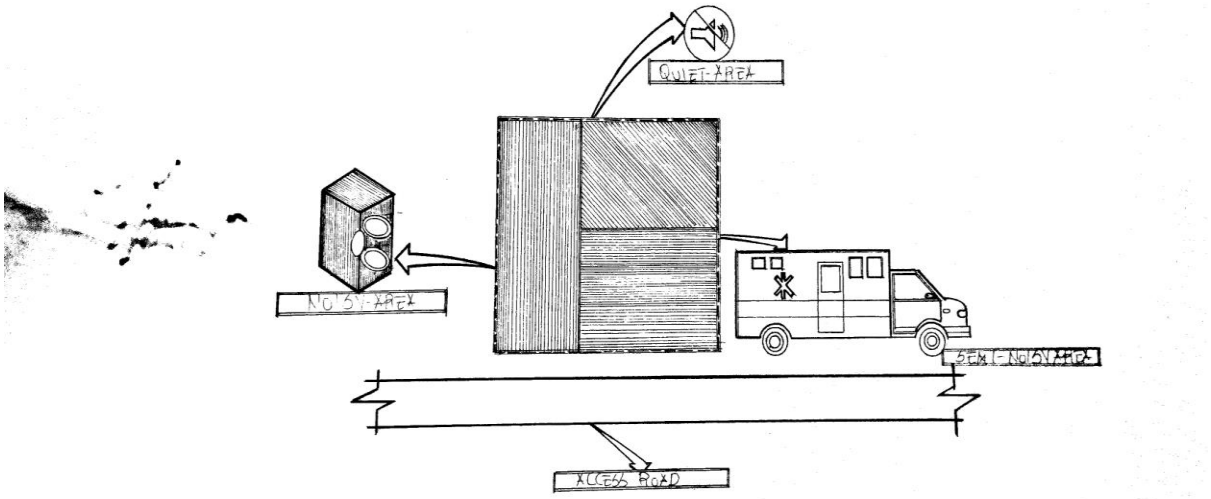
Appendix 5.2: Location Plan



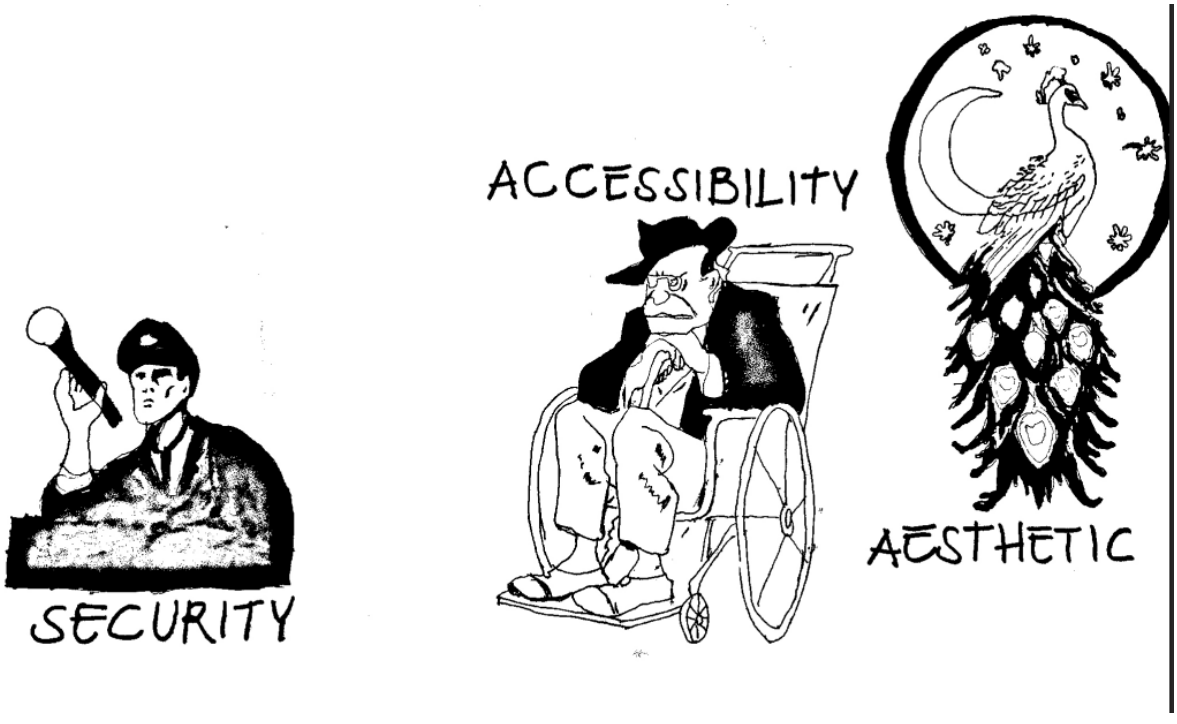
Appendix 5.3: Site Inventory



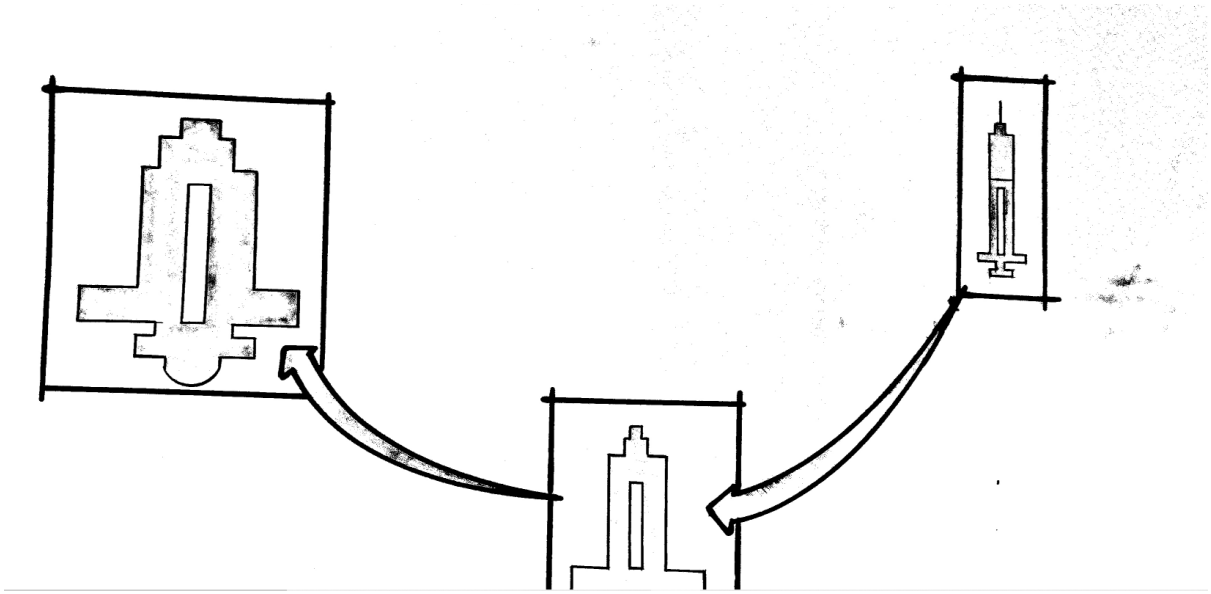
Appendix 5.4: Site Analysis



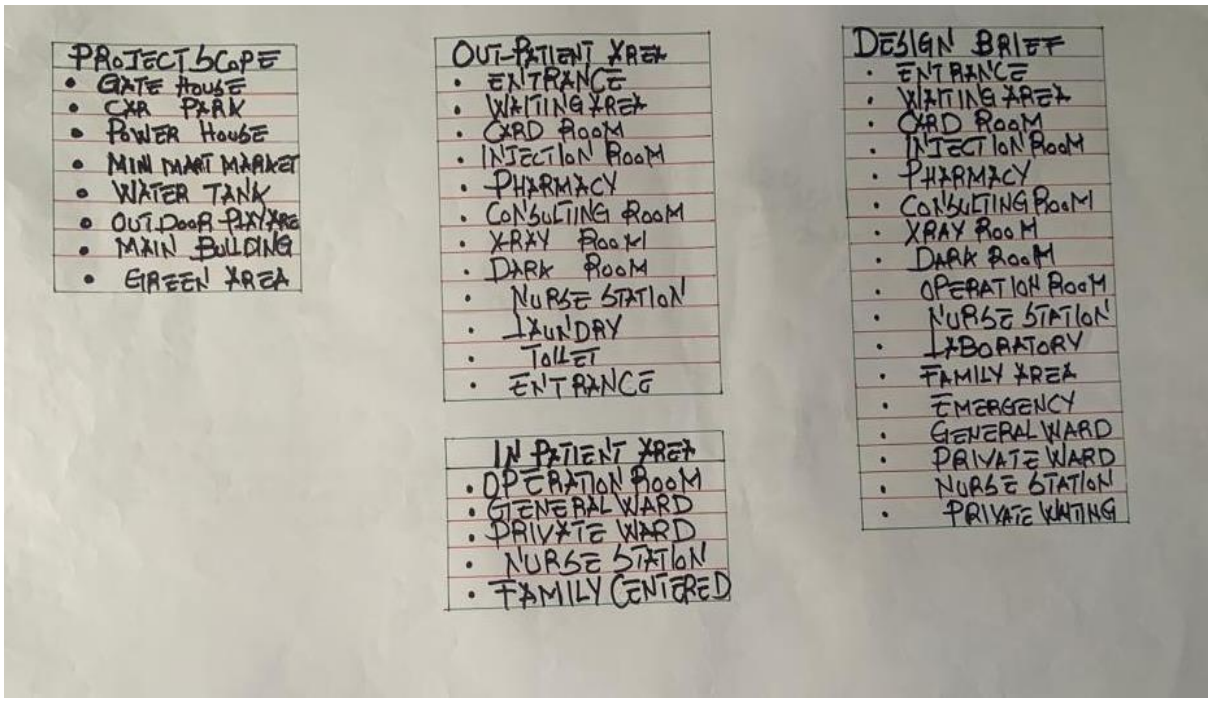
Appendix 5.5: Site Zoning



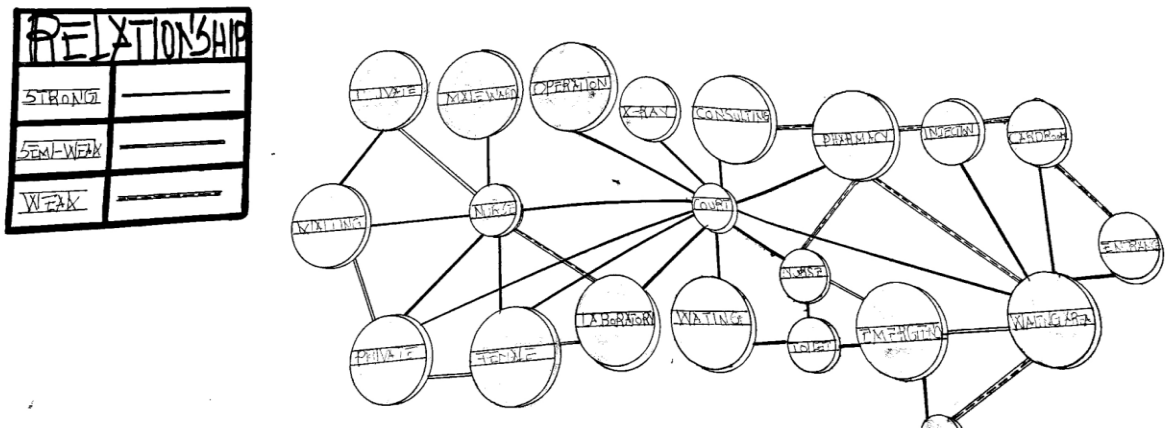
Appendix 5. 6: Design Consideration



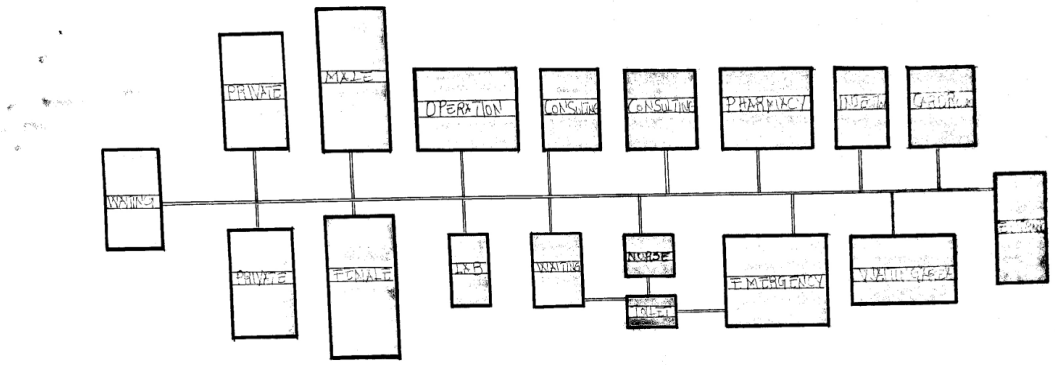
Appendix 5.7: Concept Derivation



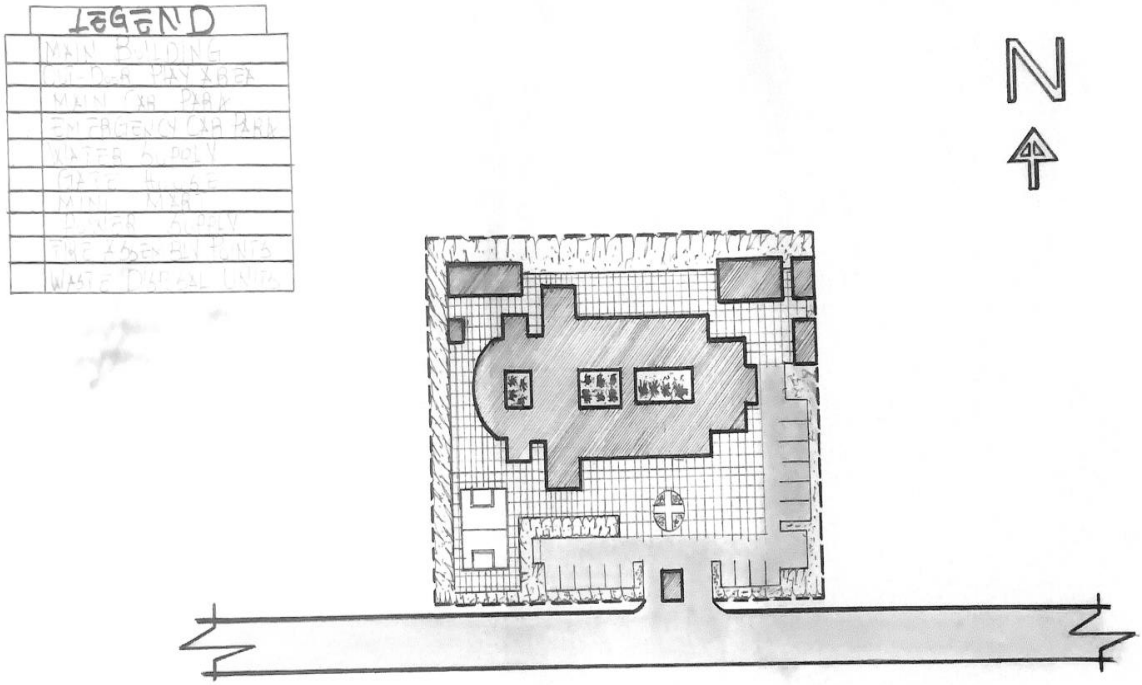
Appendix 5.8: Design Brief



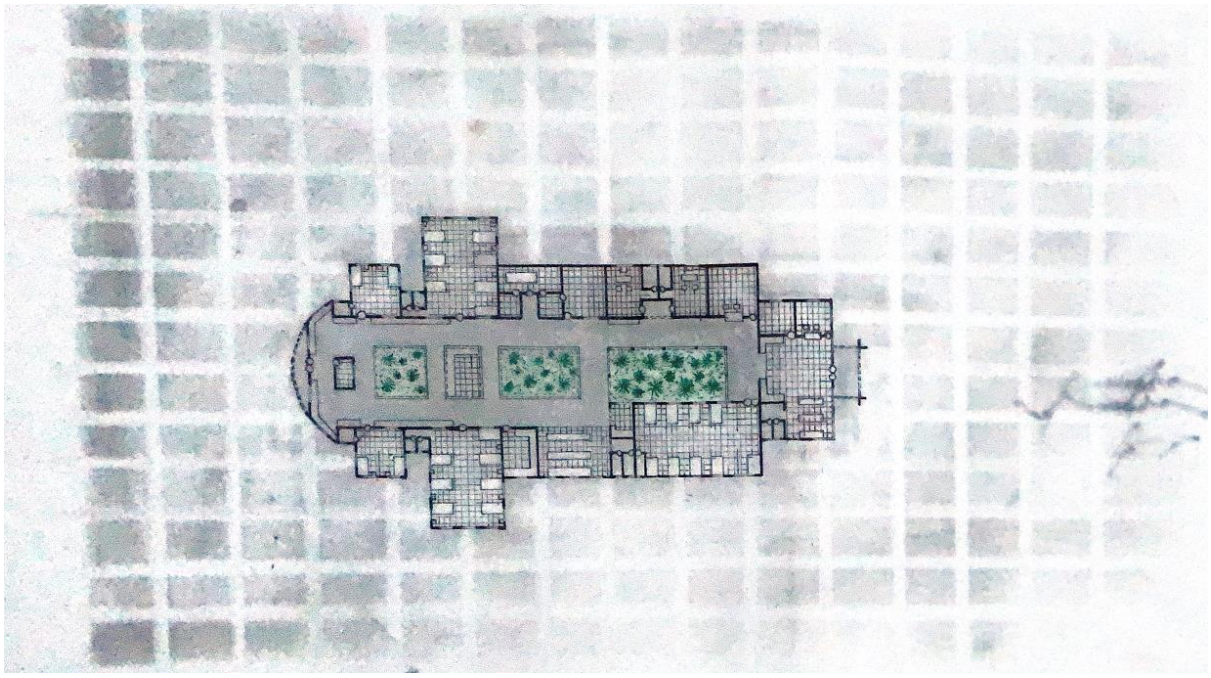
Appendix 5.9: Functional Relationship



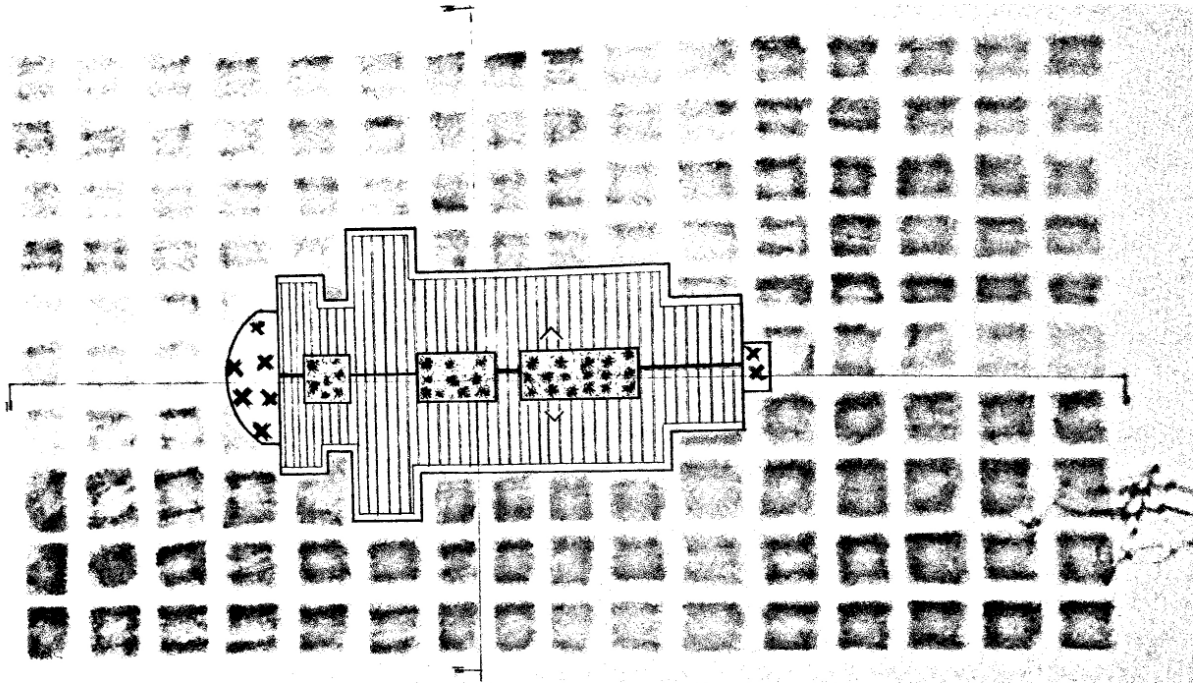
Appendix 5.10: Flow Chart



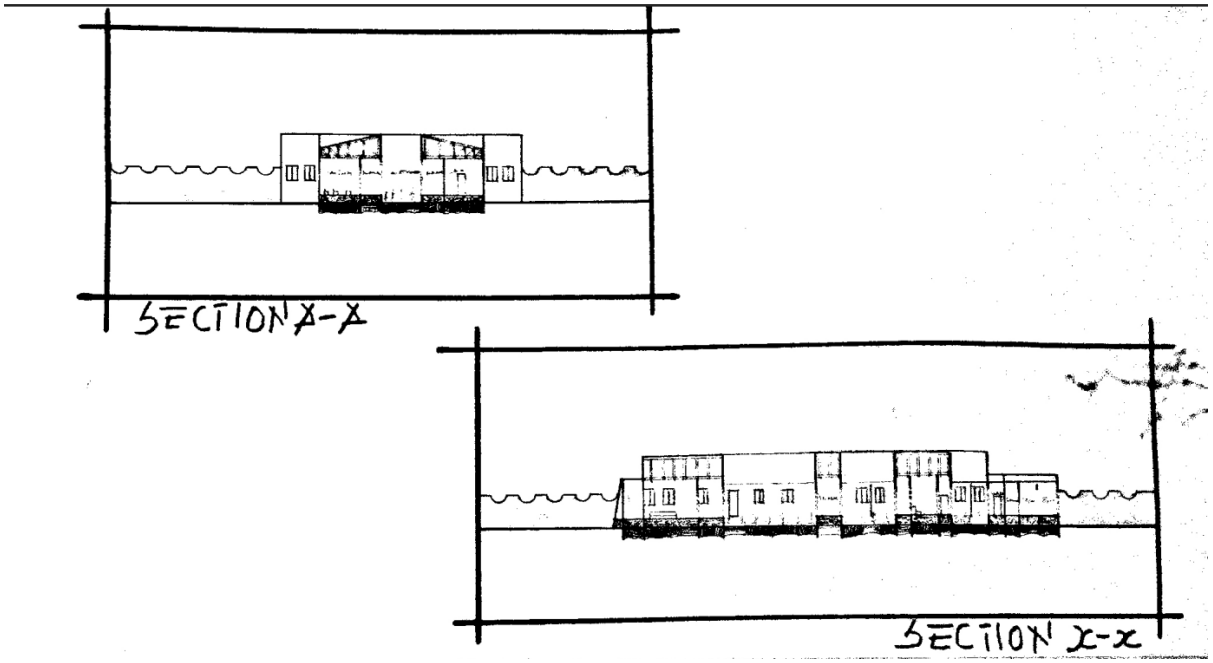
Appendix 5.11: Site Plan



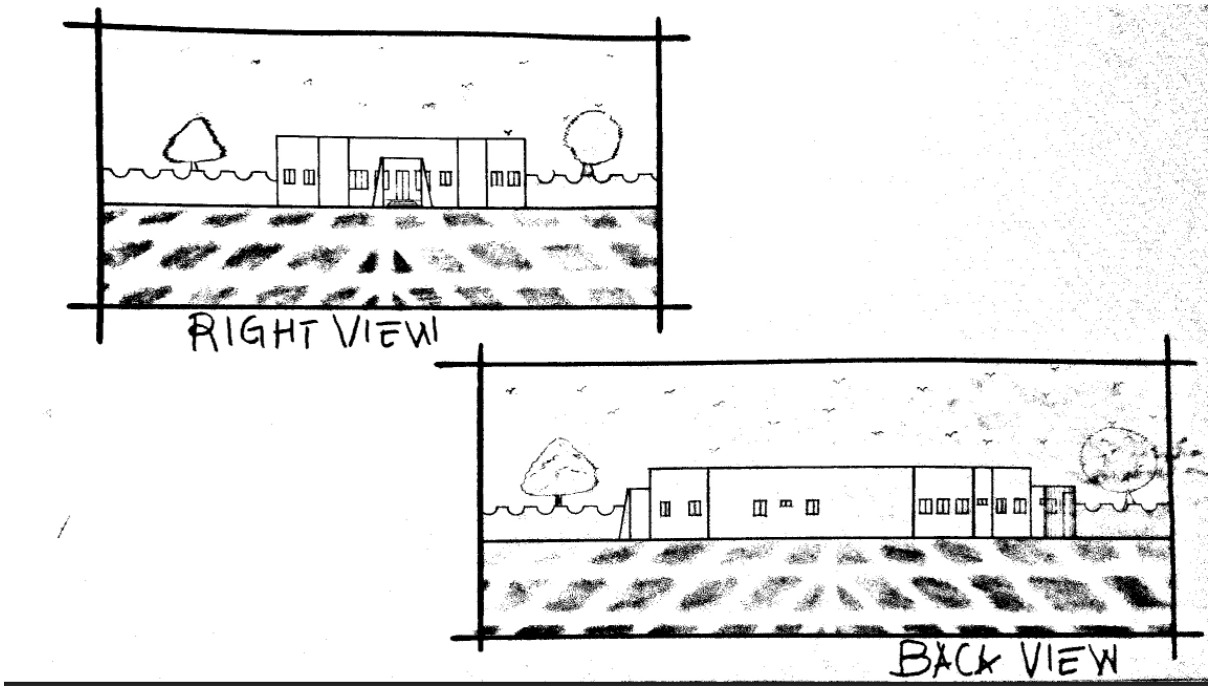
Appendix 5.12: Floor Plan



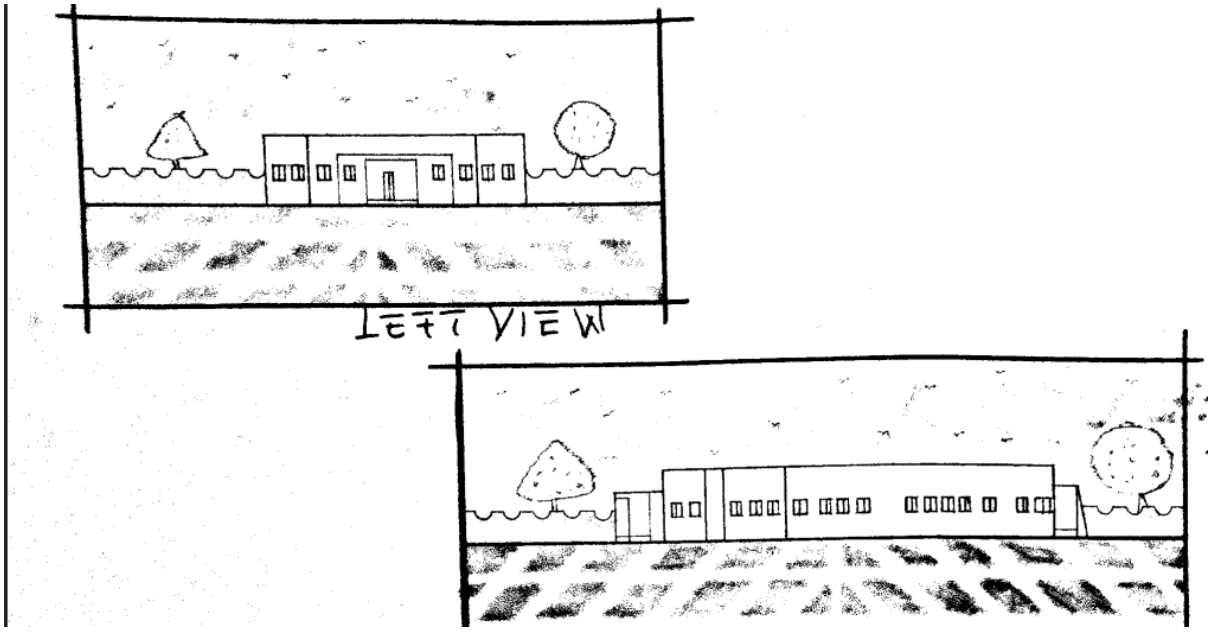
Appendix 5.13: Roof Plan



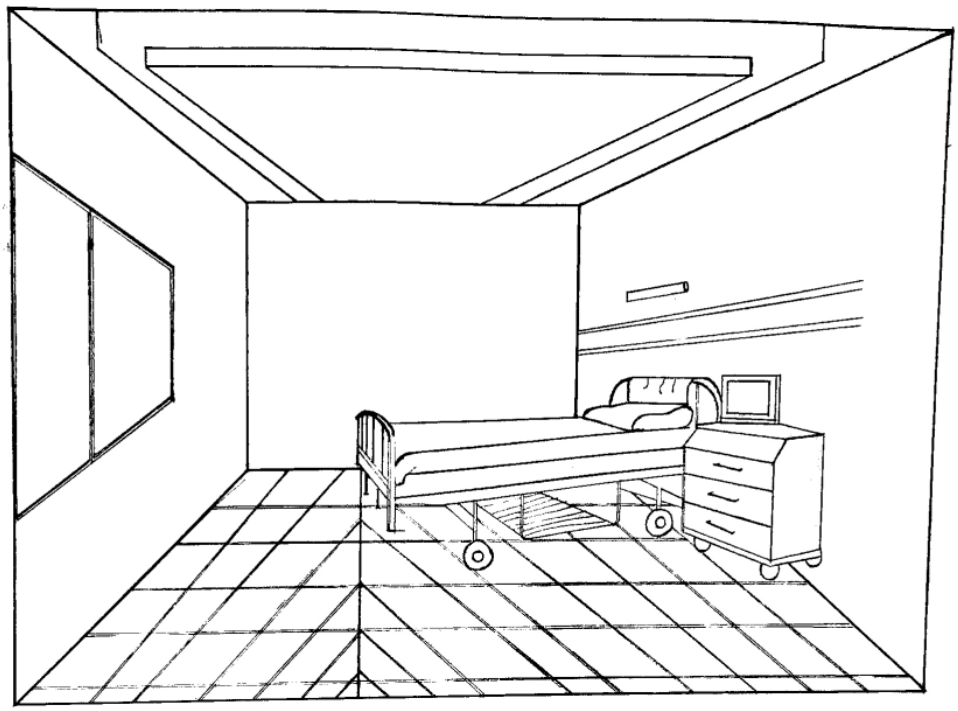
Appendix 5.14: Sections



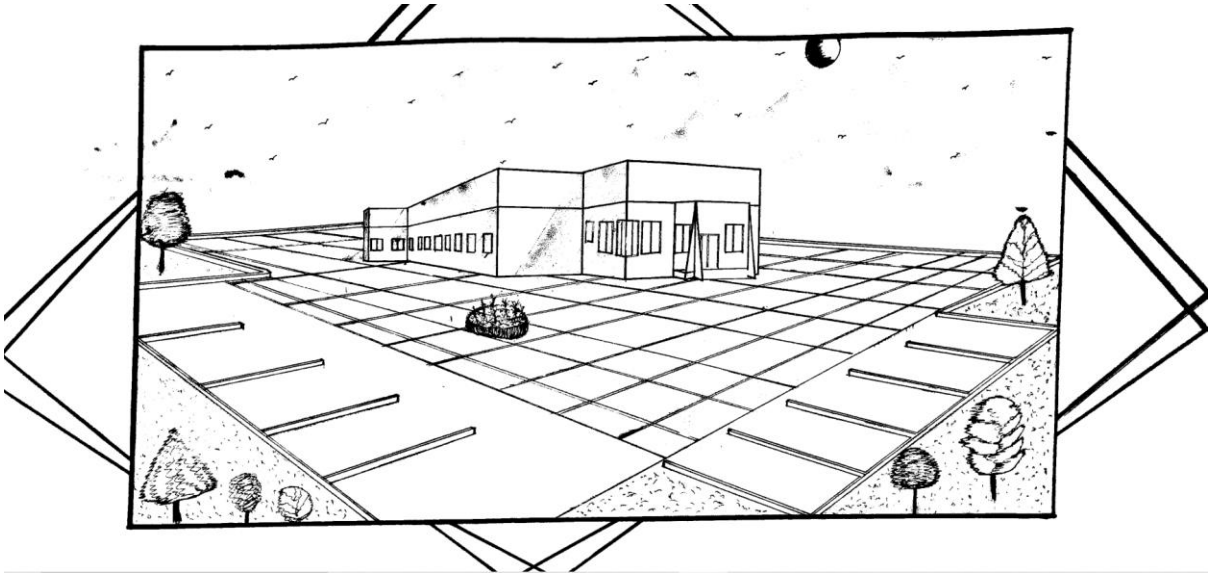
Appendix 5.15: Elevation



Appendix 5.16: Elevation



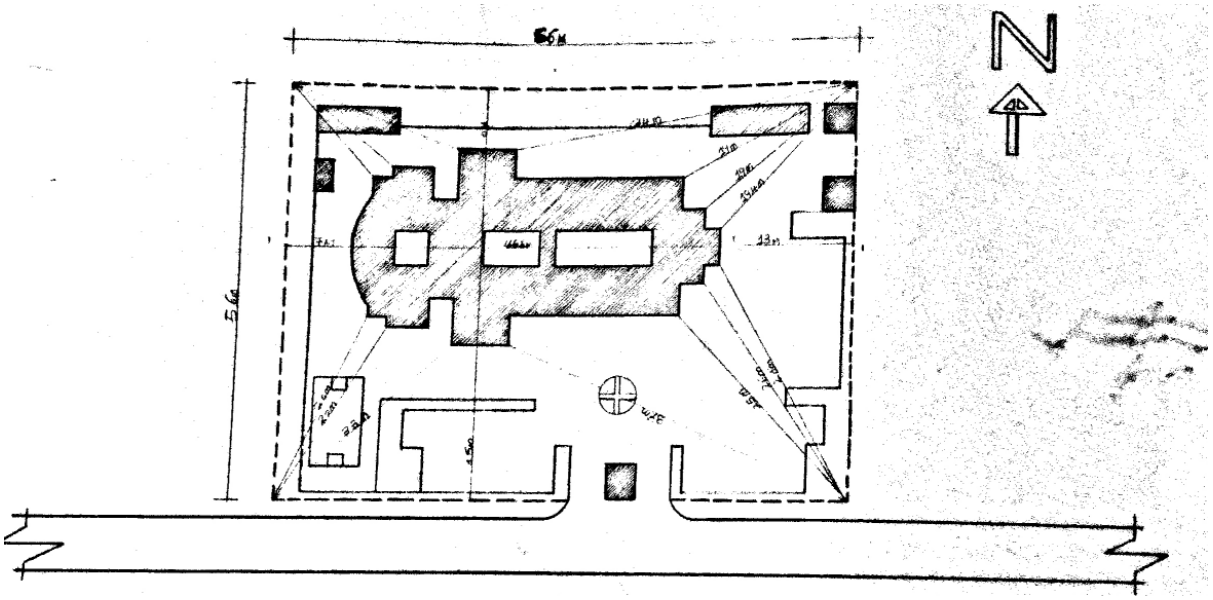
Appendix 5.17: Interior Perspective



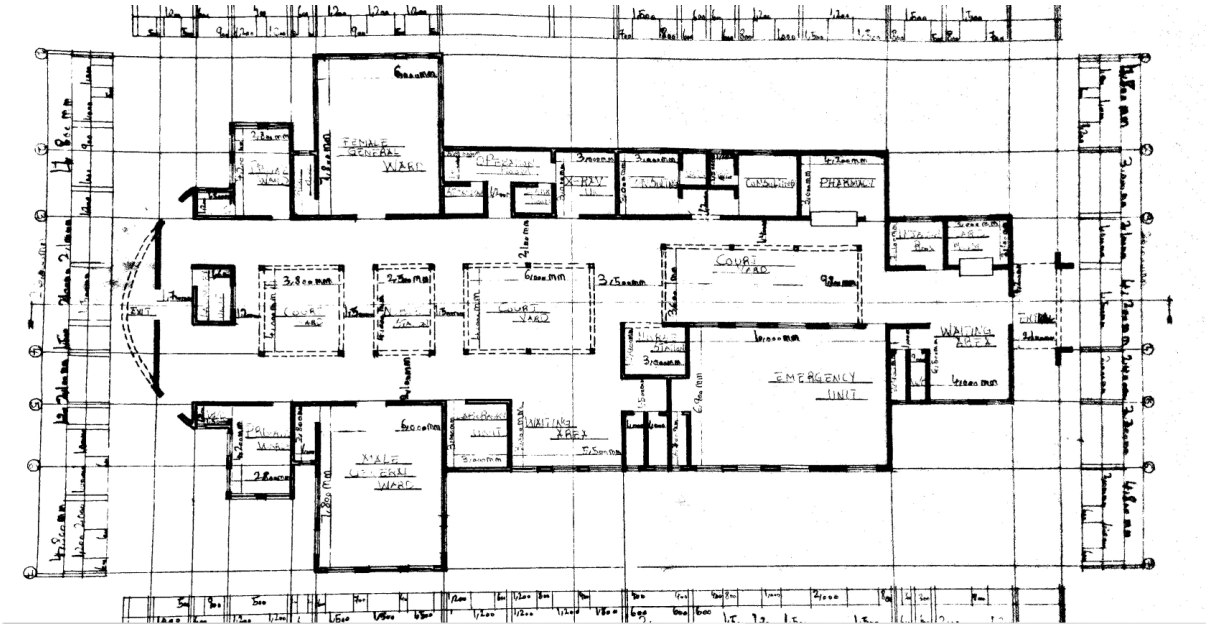
Appendix 5.18: Exterior Perspective

S/n	Requirement Unit	Length	Width	Area	No.
1.	Entrance	4,800mm	2,100mm	10,080,00mm^2	1
2.	Waiting area	8,200mm	6,000mm	49,200,00mm^2	1
3.	Card room	3,000mm	2,100mm	6,300mm^2	1
4.	Injection room	3,000mm	2,100mm	6,300mm^2	1
5.	Pharmacy	4,200mm	3,000mm	12,600mm^2	1
6.	Consulting room	3,000mm	3,000mm	9,000mm^2	2
7.	Toilet	1,500mm	1,200mm	1,800mm^2	7
8.	X-ray room	3,000mm	3000mm	9,000mm^2	1
9.	Operation room	5,200mm	1,500mm	7,800mm^2	1
10.	Dark room	2,100mm	1,900mm	3,990mm^2	1
11.	Sterilization room	2,100mm	1,900mm	3,990mm^2	1
12.	Nurse station	3,000mm	2,400mm	7,200mm^2	1
13.	Family waiting area	5,500mm	3,000mm	16,500mm^2	1
14.	Laboratory	3,000mm	3,000mm	9,000mm^2	1
15.	Emergency unit	10,600mm	6,900mm	73,140,00mm^2	1
16.	General ward	7,800mm	6,000mm	46,800,00mm^2	2
17.	Private ward	4,200mm	2,800mm	11,760,00mm^2	2
18.	Nurse station	4,000mm	2,500mm	10,000mm^2	1
19.	Laundry	2,800mm	1,600mm	4,480mm^2	1
20.	Toilet	1,500mm	1,000mm	1,500,000mm^2	6
21.	Waiting area	10,500mm	1,700mm	17,850mm^2	1
22.	Exit	7,000mm	1,200mm	8,400,00mm^2	1

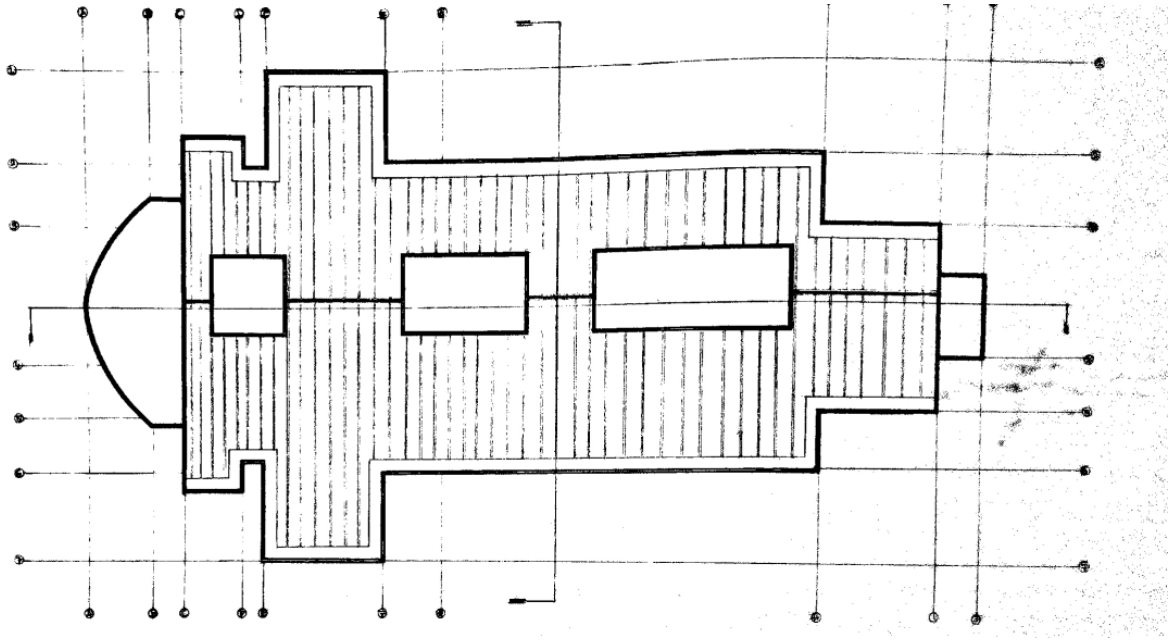
Table 4.2: Schedule of Accommodation



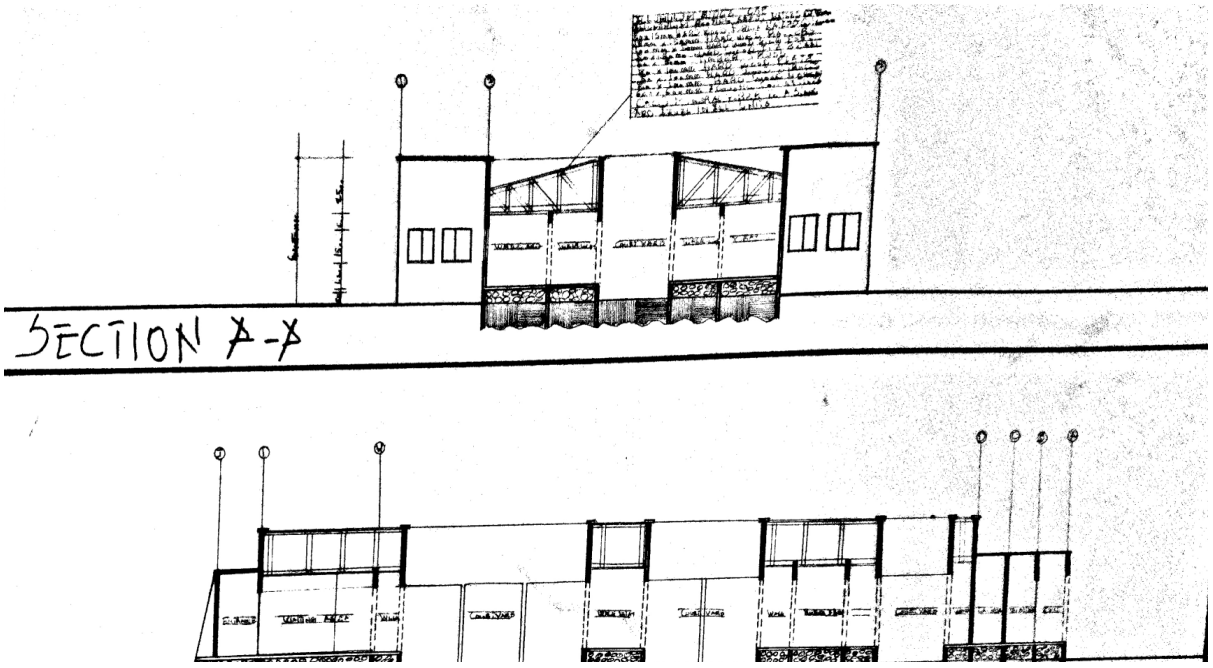
Appendix 5.19: Site Plan



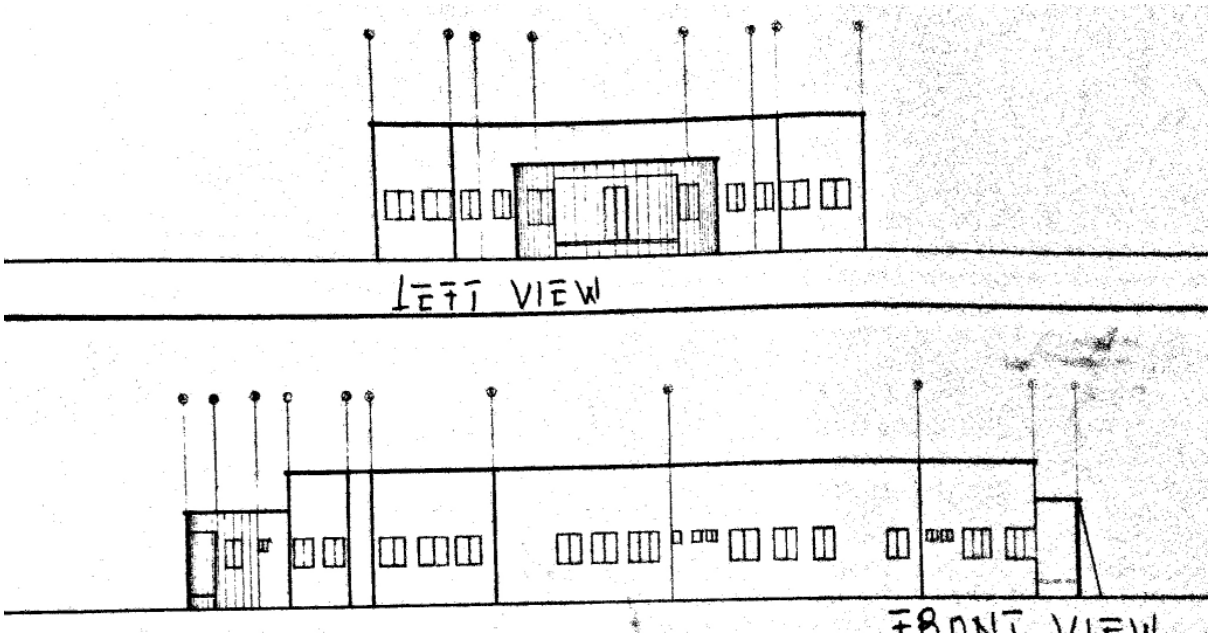
Appendix 5.20: Floor Plan



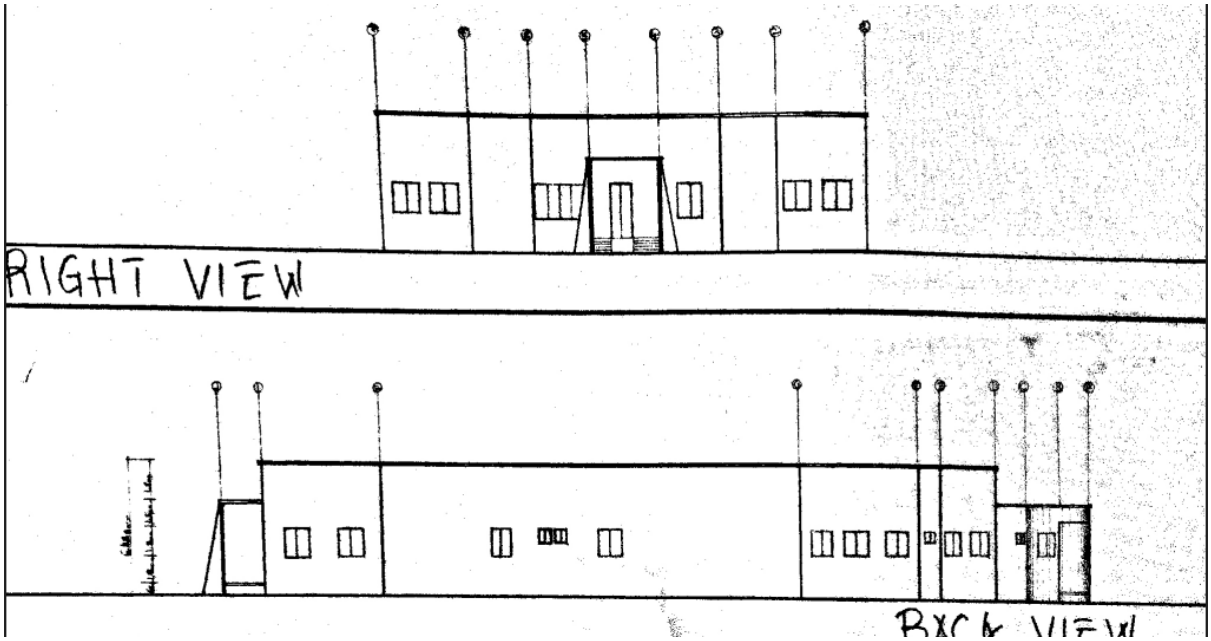
Appendix 5.21: Roof Plan



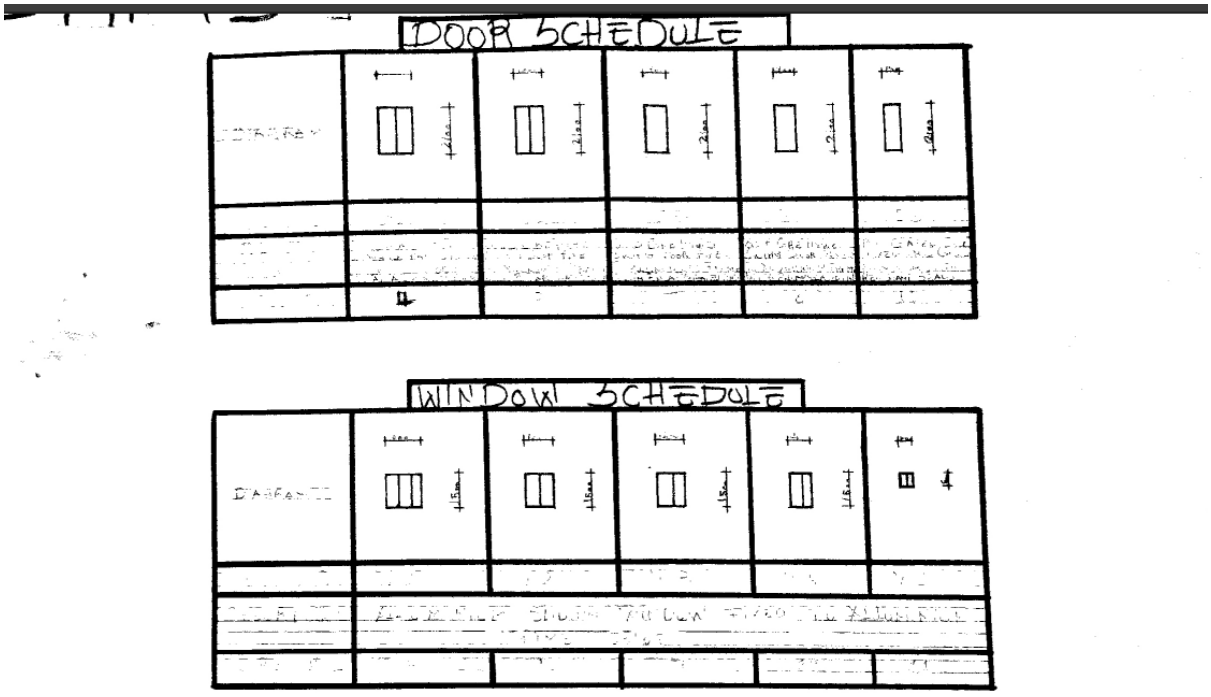
Appendix 5.22: Section



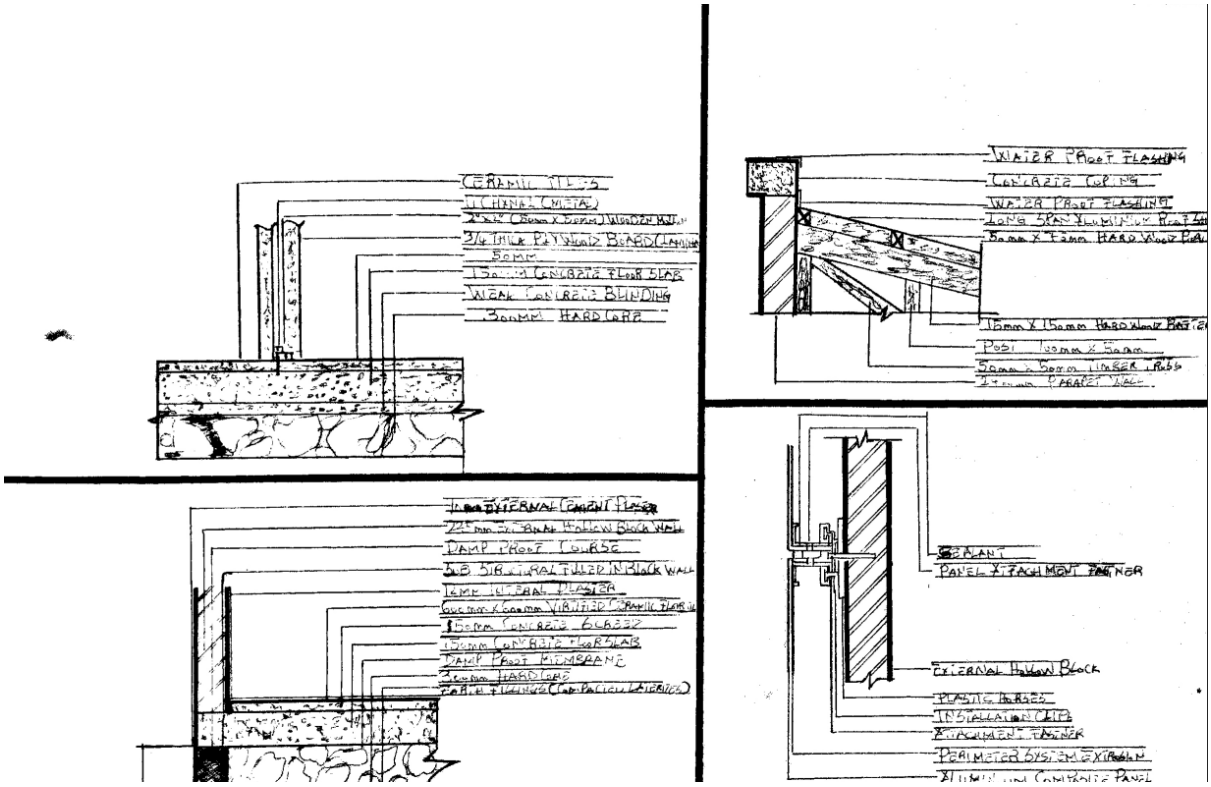
Appendix 5.23: Elevation



Appendix 5.24: Elevation



Appendix 5.25: Schedule



Appendix 5.26: Detailing