

# Engineering Phase Document for Hope Academy - Nairobi, Kenya

## Document Purpose:

This Engineering Phase Document is designed to provide comprehensive construction details for the Hope Academy project in Nairobi, Kenya. It includes specifications for building materials, construction techniques, and alignment with the budget for each phase of the project.

## 1. Introduction

- **Project Overview:** Development of a multi-level educational facility designed to serve as a beacon of learning and community engagement.
- **Location:** Nairobi, Kenya.
- **Phases:** The construction is segmented into three phases, each targeting the completion of distinct structural components.

## 2. Phase 1: Foundation and Structural Development

- **Objective:** To establish a robust foundation and erect the primary structural framework for the educational facility.
- **Duration:** 2018 to October 2024.
- **Budget:** \$241,400, with \$91,400 already spent and an additional \$150,000 required for completion.

## Detailed Construction Plan for Phase 1:

- **Ground Floor:**
  - **Excavation and Foundation:**
    - **Depth and Method:** Excavate up to 6 feet using backhoes and excavators.
    - **Materials:** Use of concrete grade C25/30 for footings and foundation slabs.
    - **Reinforcement:** High-tensile steel rebars for structural stability.
  - **Structural Framework:**
    - **Materials:** Prefabricated steel columns and beams for quick assembly and durable structure.
    - **Construction Technique:** Modular construction techniques where possible to reduce on-site construction time.
  - **Budget Allocation:** \$30,000 (includes costs for materials, labor, equipment hire, and safety measures).
- **First Level (1st Floor):**
  - **Structural Framework and Flooring:**
    - **Materials:** Reinforced concrete slabs for floors, structural steel for beams and columns.
    - **Flooring:** Polished concrete for durability and ease of maintenance.
  - **Utilities Installation:**
    - **Plumbing:** PVC and copper piping for water supply and drainage.

- **Electrical:** Conduits and cabling for electrical distribution, compliant with Kenyan electrical standards.
  - **Partitioning and Finishing:**
    - **Materials:** Lightweight aerated concrete blocks for internal partitioning.
    - **Finishing:** Emulsion paint for walls, epoxy paint for floors.
  - **Budget:** \$30,000.
- **Second Level:**
  - **Structural Framework and Flooring:**
    - **Materials:** Reinforced concrete slabs for floors, structural steel for beams and columns.
    - **Flooring:** Polished concrete for durability and ease of maintenance.
  - **Utilities Installation:**
    - **Plumbing:** PVC and copper piping for water supply and drainage.
    - **Electrical:** Conduits and cabling for electrical distribution, compliant with Kenyan electrical standards.
  - **Partitioning and Finishing:**
    - **Materials:** Lightweight aerated concrete blocks for internal partitioning.
    - **Finishing:** Emulsion paint for walls, epoxy paint for floors.
  - **Budget:** \$30,000.
- **Third Level:**
  - **Structural Framework and Flooring:**
    - **Materials:** Reinforced concrete slabs for floors, structural steel for beams and columns.
    - **Flooring:** Polished concrete for durability and ease of maintenance.
  - **Utilities Installation:**
    - **Plumbing:** PVC and copper piping for water supply and drainage.
    - **Electrical:** Conduits and cabling for electrical distribution, compliant with Kenyan electrical standards.
  - **Partitioning and Finishing:**
    - **Materials:** Lightweight aerated concrete blocks for internal partitioning.
    - **Finishing:** Emulsion paint for walls, epoxy paint for floors.
  - **Budget:** \$30,000.
- **Fourth Level:**
  - **Structural Framework and Flooring:**
    - **Materials:** Reinforced concrete slabs for floors, structural steel for beams and columns.
    - **Flooring:** Polished concrete for durability and ease of maintenance.
  - **Utilities Installation:**
    - **Plumbing:** PVC and copper piping for water supply and drainage.
    - **Electrical:** Conduits and cabling for electrical distribution, compliant with Kenyan electrical standards.
  - **Partitioning and Finishing:**
    - **Materials:** Lightweight aerated concrete blocks for internal partitioning.
    - **Finishing:** Emulsion paint for walls, epoxy paint for floors.
  - **Budget:** \$30,000.

## Phase 2: Expansion and Enhancement

- **Objective:** To expand the building by adding additional classroom spaces and specialized rooms tailored to educational activities such as laboratories or art rooms.
- **Duration:** November 2024 to July 2025.
- **Budget:** \$150,000.

## Detailed Construction Plan for Phase 2:

- **Each Level (Ground Floor to Fourth Floor):**
  - **Structural Framework:**
    - **Materials:** Continued use of prefabricated steel beams and columns, ensuring quick assembly and structural coherence with Phase 1.
    - **Construction Technique:** Standard slab and column construction, utilizing formwork systems for quick and efficient concrete placement.
  - **Flooring:**
    - **Materials:** Use of vinyl tiles for classrooms for durability and ease of maintenance; anti-slip tiles in laboratories.
  - **Utilities Installation:**
    - **Plumbing:** Integration of additional fixtures and fittings for science labs and art rooms, including sinks and eyewash stations.
    - **Electrical:** Enhanced electrical layouts to support specialized equipment in labs and art rooms.
  - **Partitioning and Finishing:**
    - **Partitioning:** Use of glass partitions for art rooms to allow natural light; robust partitioning for science labs for safety.
    - **Finishing:** Acid-resistant countertops for labs, soundproofing materials for music rooms.
  - **Budget Allocation per Level:** \$30,000 (includes costs for specialized materials, labor, and additional safety features).
- **Specialized Spaces:**
  - **Laboratories:**
    - **Materials:** Epoxy resin countertops for chemical resistance.
    - **Safety Features:** Fume hoods, emergency showers, and fire-resistant cabinets for chemical storage.
  - **Art Rooms:**
    - **Materials:** Natural light enhancements, adjustable lighting systems.
    - **Features:** Kiln for ceramics, storage for art supplies.
  - **Music Rooms:**
    - **Soundproofing:** Installation of sound-absorbing panels and double-glazed windows to minimize sound transmission.
    - **Acoustics:** Design considerations to enhance acoustical properties of the space.

## Phase 3: Community and Worship Facilities

- **Objective:** To construct multi-purpose facilities that support both educational and community functions, including a kitchen and dining hall, a fellowship hall, and a church worship space/school chapel.
- **Duration:** August 2025 to July 2026.
- **Budget:** \$400,000.

## Detailed Construction Plan for Phase 3:

- **Kitchen and Dining Hall/Fellowship Hall:**
  - **Structural Framework and Materials:**
    - **Materials:** Durable, easy-to-clean materials such as stainless steel for kitchen surfaces and commercial-grade flooring.
    - **Construction Technique:** Modular units for kitchen appliances and fixtures to speed up installation and ensure quality.
  - **Utilities Installation:**
    - **Plumbing:** High-capacity plumbing systems to accommodate commercial kitchen needs.
    - **Electrical:** Heavy-duty electrical circuits designed to handle high-power kitchen appliances.
  - **Safety Installations:**
    - **Materials:** Fire-resistant materials, including wall paneling and ceiling tiles.
    - **Features:** Comprehensive fire suppression systems, including sprinklers and fire extinguishers.
  - **Budget:** \$150,000 (includes materials, labor, and installation of specialized equipment).
- **Church Worship Space/School Chapel:**
  - **Structural Framework and Acoustics:**
    - **Materials:** High-quality sound-absorbing materials for walls and ceilings to optimize acoustics.
    - **Construction Technique:** Custom carpentry for pews and woodwork, enhancing the aesthetic and functional aspects of the worship space.
  - **Lighting and Sound System:**
    - **Sound System:** Installation of a state-of-the-art sound system tailored for clear audio distribution.
    - **Lighting:** Adjustable lighting solutions to cater to various events, from school assemblies to religious services.
  - **Seating and Aesthetics:**
    - **Seating:** Ergonomically designed seating for comfort during long sessions.
    - **Decorative Elements:** Stained glass installations and other decorative features to create a serene and inspiring environment.
  - **Budget:** \$250,000 (covers all construction and finishing costs including specialized acoustic and lighting systems).

This phase is designed to not only complete the educational facility but also to create a community hub that facilitates dining, fellowship, and worship, serving the broader needs of both the school and the surrounding community.

## **Conclusion**

Phase 3 concludes the construction of Hope Academy, with each component designed to support a wide range of activities and functions. This phase ensures that the facility will serve as a cornerstone of community interaction and spiritual growth.