



SEED OF HEALTH, INC

DESIGN AND CONSTRUCTION PROPOSAL

BAHIR DAR HOSPITAL
BAHIR DAR, ETHIOPIA



IN PARTNERSHIP WITH:
JOURNEYMAN INTERNATIONAL



Dear Future Project Sponsors,

In 1981, the World Health Organization established the ambitious goal of Health For All by the year 2000. The plan was largely unsuccessful, as health care has actually deteriorated in many of the targeted nations. This was over 30 years ago, and we at Seed of Health refuse to sit idly by and wait for others to provide quality health care to people who need it most. The quality of health care is worst in developing countries such as Ethiopia, where only ten percent of ill persons receive medical treatment and the average life expectancy is limited to 50.8 years. The developing world cannot wait for a miracle. Neither will we.

In order to bring about the necessary change in global health care, the non-profit organization Seed of Health was founded in 2011 by Roza Feleke, a native Ethiopian living in the Bay Area, and a group of UC Berkeley pre-medical students. Seed of Health aims to build and finance medical facilities throughout the developing world by utilizing UC Berkeley pre-medical students, university faculty and professional volunteers who possess both a passion for promoting global medical equality and an entrepreneurial mindset. As our first step toward achieving our vision of globally available quality health care, we have taken the initiative to build a higher health center in Bahir Dar, Ethiopia.

Seed of Health has already obtained a half acre of land on the outskirts of Bahir Dar from the local government and has established contacts in the region to help raise community support for our health center. Our clinic will be situated next to a major highway at the edge of the city, which will allow us to treat a large spectrum of patients from both the inner city and the rural countryside. Given the clinic's diverse patient population, our clinic will be able to cross subsidize medical treatment costs for our lower income patients by using the revenue generated from our wealthier urban patients. We will never refuse medical treatment to a patient because of his or her financial status or background.

Seed of Health, Inc.
Journeyman International, Inc.







Dear Reader,

Have you ever felt so passionate about something that you were not able to believe the opportunity when it presented itself? That is what this process and journey has been for me in working on this project.

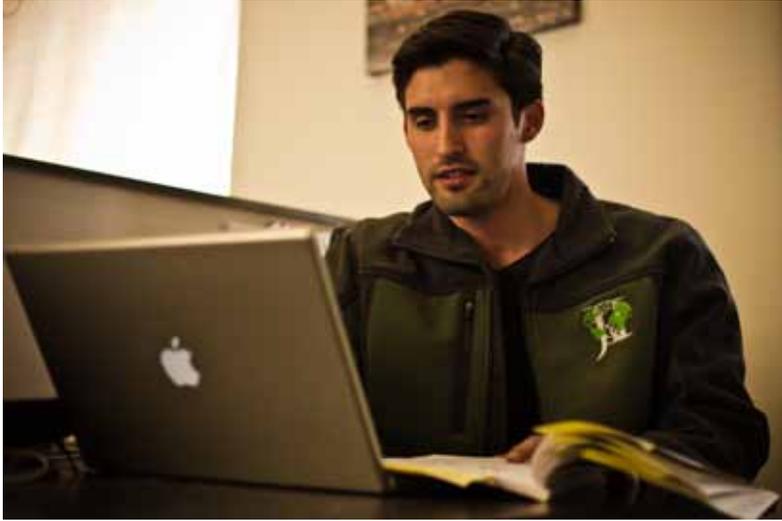
My name is Katherine Aalund and I am a 5th year landscape architecture major at California Polytechnic State University, San Luis Obispo. I have wanted to participate in humanitarian design for a long time and have been blessed with the opportunity to work alongside an organization as incredible as Journeyman International.

As a Christian walking in my faith I believe that we are the hands and feet of our Creator and that it is our duty and prerogative to reach out and provide to those in need. I have been given the opportunity to receive a higher education and learn a specific tool, a practice. I intend to utilize this tool to further my Father's kingdom here on Earth in the hopes that more will be saved through the collaboration of work on this project.

This hospital in Bahir Dar, Ethiopia is a dream for me, and over the last two months I have thoroughly enjoyed researching the culture, land, traditions, and rich history of the area. As the project progresses and design commences I find myself on the edge of my seat, eagerly awaiting the next adventure.

I invite you to stay tuned to this project and design, because I hope it offers the same adventure to you as it does to me.

Sincerely,
Katherine Aalund



Dear Reader,

The book you are holding in your hands represents ten weeks of in depth research and analysis on a very special place in our world, Bahir Dar, Ethiopia. As you browse through these pages, you will realize that this is an area lacking basic access to healthcare facilities. Through careful work and planning, access to healthcare can be provided to these deserving people by the Journeyman International team. Because of this, I am proud to say that I am serving as the Architectural Designer for the Bahir Dar Hospital Project.

This project marks the first time in my career that I have been able to use the skills I have acquired in my studies in a meaningful, helpful, and relevant way. To me, the details set forth in this book are more than just numbers in spreadsheets or words in an essay. Truly, the information gathered thus far represents the thousands of lives that will eventually be saved by this project.

I am greatly honored to be a part of the Journeyman International team as I am looking forward to the next step in the process. With all of the important information collected, it is my goal to now provide my highest quality of work in the design of the hospital facilities. In the coming weeks, our team will be pooling resources, creating innovative solutions, and challenging ourselves to bring this project to life at full scale. Please check back with us as we embark on the rest of this Journey.

Much appreciated,
Tyler Thomas

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EXECUTIVE SUMMARY



RESPONDING TO A PROBLEM



PROJECT TEAMS

- Journeyman International, Inc. 501(c)3
Daniel Weins - President
(805) 952-5469
9393 Eagle Vista Way
Atascadero, Ca 93422
- Seed of Health
Roza Feleke - President
(510) 285-7917
P.O. Box 364
Oakland, Ca 94704



LOCAL CONTEXT

- This project is located within the city **Bahir Dar, Ethiopia.**
- Ethiopia is the **oldest independent** country in Africa.
- Ethiopia has 80 different ethnic groups speaking over 83 different languages.
- Located within the **Tropical Zone** between the equator and Tropic of Cancer, in the “Horn of Africa”.
- Ethiopia produces more coffee than any other African country.
- 1 US Dollar = Approximately 17 Birr (Ethiopian Currency)
- The majority of the population practices **Christianity** through the Ethiopian Orthodox Church.
- Bahir Dar is the third largest city in the country, and is home to a population of over **200,000.**
- 87% of the population lives in **rural areas.**



HEALTH STATUS & PROBLEMS

- Life expectancy: **50.8 years**
- Infant Mortality Rate (IMR): **97 per 1000 births**
- Under Five Mortality Rate: **500-700 per 1000 births**
- Burden of diseases is **350 per 1000 people**
- Many of these diseases are **preventable infectious diseases**.
- **Prevalent diseases:** acute respiratory infection, malaria, nutritional deficiencies, diarrhea, and HIV/AIDS
- The healthcare status is extremely **poor**, with only **10% of ill persons obtaining treatment**.
- Bahir Dar, has 1 referral hospital, 2 health centers, 1 clinic, and 21 privately owned health facilities, for a total of **25 existing facilities**.
- A typical person visits the hospital once every four years.
- **9.5% of the rural population** utilizes the existing health facilities.
- **14% of the urban population** utilizes the existing health facilities.
- Need for a **lower cost** treatment facility that has **higher quality service**.
- Need for an **educational facility** to help distribute information about preventable diseases.



PROJECT OVERVIEW

- This facility will sit on 1 acre of land.
- Facility located approximately 1 mile from the outskirts of town.
- The building will be 4,000 square feet total with two stories.
- Primary structural material: Reinforced concrete masonry unit (CMU).
- The occupancy for this facility will be: 60 persons.
- The facility will be managed and operated by Ethiopian professionals.





SCOPE ANALYSIS

- The enclosed analysis aims to detail the individual construction scopes that will be required for the Bahir Dar Clinic.

GENERAL REQUIREMENTS

TEMPORARY FACILITIES AND CONTROLS

TRAFFIC CONTROL

STORM WATER POLLUTION CONTROL

CUTTING AND PATCHING

SITWORK

SURVEYING

PROTECTION OF EXISTING IMPROVEMENTS

SELECTIVE DEMOLITION

EXCAVATION

GRADING

GRAVEL TRENCHES AND BIOSWALES

BASE (FLATWORK)

BASE (PAVING)

BASE (FOUNDATION)

WATER DISTRIBUTION SYSTEM

SANITARY SEWER SYSTEM

STORM DRAINAGE

GAS DISTRIBUTION SYSTEM

SITE CONCRETE

LANDSCAPE PLANTING

STRUCTURAL CONCRETE

CONCRETE SEALER

MASONRY

METALS

SHEET METAL FABRICATIONS

ROUGH CARPENTRY

CASEWORK

BUILDING INSULATION

JOINT SEALANTS

DOORS AND WINDOWS

FINISHES

SIGNAGE



FINANCIAL ANALYSIS

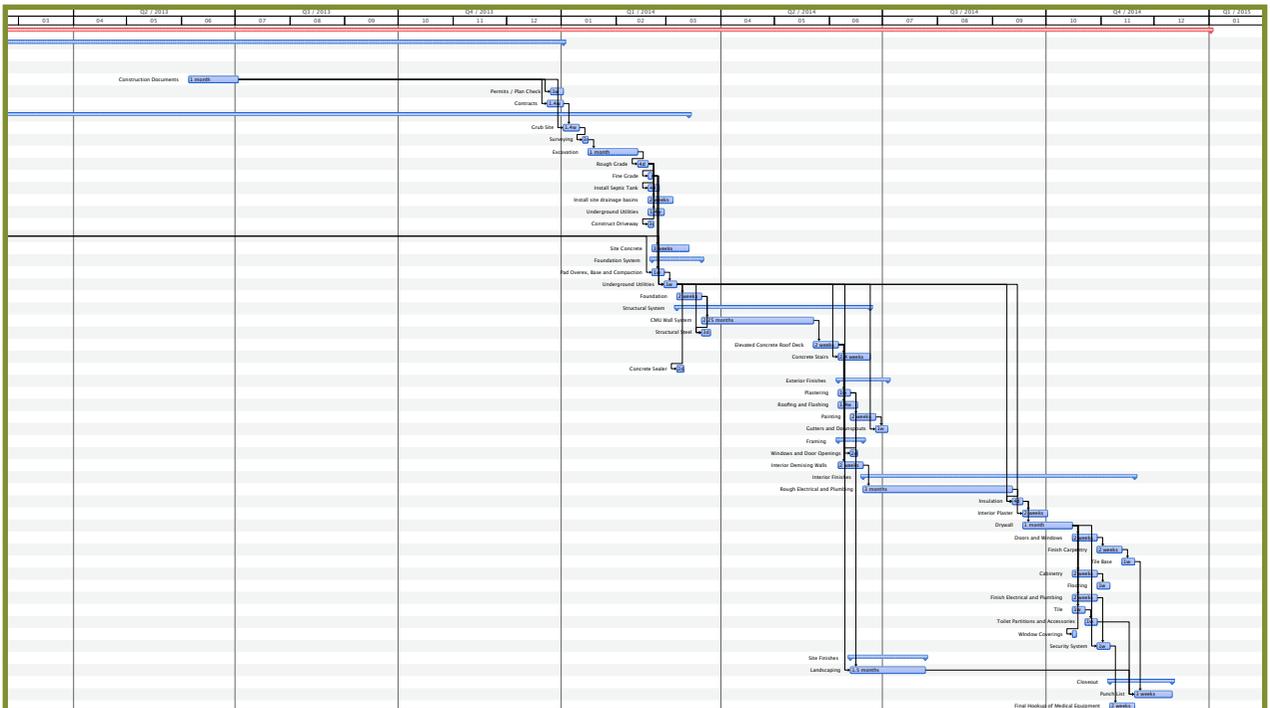
- Total Estimated Cost: \$104,550
- Land Procurement: Donated through Ethiopian government grant

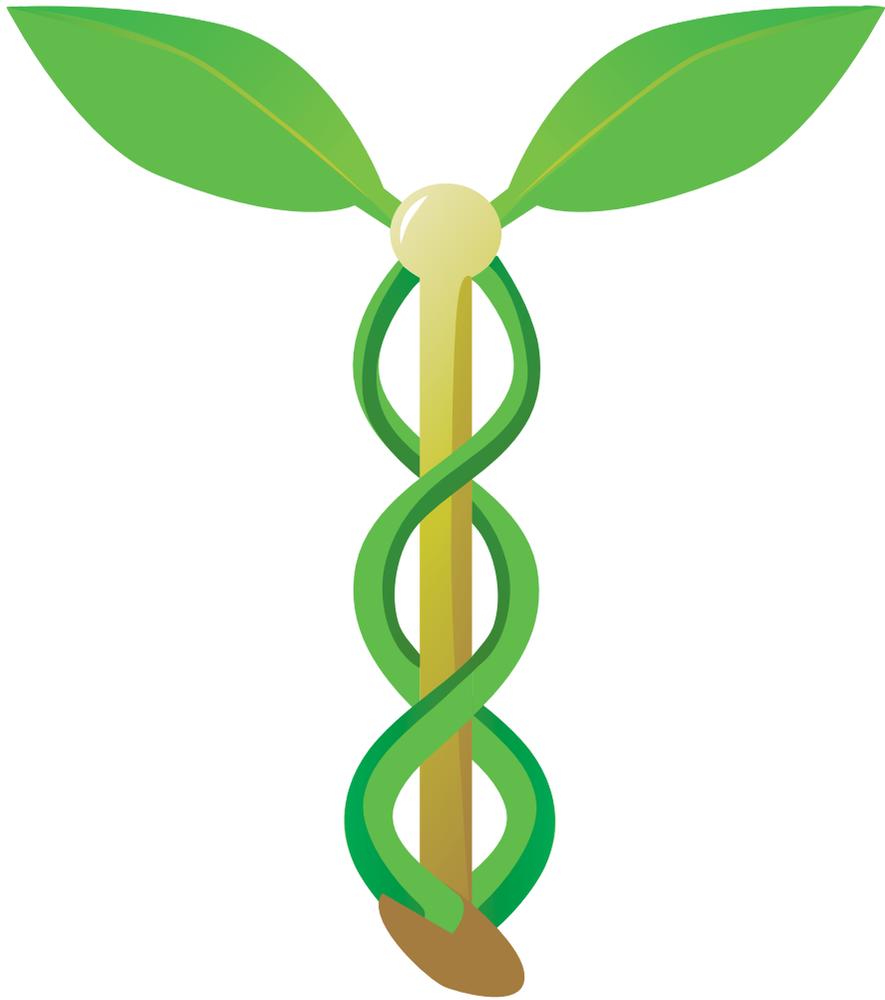
Construction Estimate Summary

DESCRIPTION OF WORK	MATERIAL	LABOR	EQUIPMENT	ESTIMATE USD	ESTIMATE Birr
GENERAL CONDITIONS				\$ 16,100.00	\$ 273,700.00
SITE WORK				\$ 20,000.00	\$ 340,000.00
CONCRETE				\$ 14,450.00	\$ 245,650.00
MASONRY				\$ 10,000.00	\$ 170,000.00
METALS				\$ -	\$ -
CARPENTRY				\$ 8,500.00	\$ 144,500.00
THERM.&MOIST.PROTECT				\$ 2,000.00	\$ 34,000.00
DOORS & WINDOWS				\$ 6,000.00	\$ 102,000.00
FINISHES				\$ 9,250.00	\$ 157,250.00
SPECIALTIES				\$ 1,250.00	\$ 21,250.00
EQUIPMENT				\$ -	\$ -
FURNISHINGS				\$ -	\$ -
SPECIAL CONSTRUCTION				\$ -	\$ -
CONVEYING SYSTEMS				\$ -	\$ -
MECHANICAL WORK				\$ 7,000.00	\$ 119,000.00
ELECTRICAL				\$ 10,000.00	\$ 170,000.00
				\$ -	\$ -
TOTAL				\$104,550.00	\$1,777,350.00



SCHEDULE





PROJECT TEAMS



JOURNEYMAN INTERNATIONAL AND SEED OF HEALTH



SEED OF HEALTH

Seed of Health is a start-up non-profit dedicated to the construction, finance, and operation of teaching hospitals in Africa.

Our president Roza Feleke is originally from Ethiopia. Upon earning her degree in Political Science from San Francisco State University in 2007, Roza traveled to Ethiopia to visit her family (her father was a physician who ran a small medical clinic in Bahir Dar). While in Ethiopia, Roza learned that the Ethiopian government was giving away free land to Ethiopian diasporas who wanted to invest in education and health care. Upon this discovery, Roza Feleke worked on a project proposal for a medical clinic and applied for an investment certificate to build a higher health clinic in Bahir Dar, Ethiopia. Roza submitted both the project proposal and the investment certificate to the government to get the land for the health clinic free of lease. In 2008, a year after her return to the United States, Roza learned that the government granted her an acre of land for her project.

Roza collaborated with co-founder Bryan Marks and orchestrated a team of passionate pre-medical students at UC Berkeley to launch Seed of Health. In partner-

SEED OF HEALTH SERVICES:

- 1. Raise financial support needed for construction and operation costs*
- 2. Furnish, staff and operate humanitarian medical facilities*

ship with local governments and other NGO's, Seed of Health will be developing a medical clinic in Bahir Dar, Ethiopia. The health status of this region is among the lowest in the world, with an average life expectancy of 56.2 years. The infant mortality rate is 101 deaths per 1000 live births and the under-five mortality rate is 673 deaths per 100,000 live births. However, nearly one-third of these deaths are preventable, and it is time to go to work.

BUSINESS MODEL:

This vision is spearheaded by young professionals who volunteer their services and time. Seed of Health capitalizes on pre-med university students to acquire much of the research needed to professionally develop this facility.





JOURNEYMAN INTERNATIONAL

The Journeyman International vision was launched with the intent of filling the expertise void between international NGO's and the new facilities they construct. While developing a dental clinic in Belize as a senior project, a group of architecture and environmental design students from CalPoly University began recognizing to potential to fill this need with a construction focused non-profit endeavor. Since filing for incorporation in 2009, Journeyman International has designed an orphanage in Mexico, a development center in Zambia, and a dental clinic in Belize. These projects were a catalyst- we are just getting started.

JOURNEYMAN OBJECTIVES

- 1. Partner with reputable NGO's and design construct humanitarian facilities.*
- 2. Relieve the construction burden of partnered NGO's, allowing them to focus on their mission.*
- 3. Introduce economically feasible "Green" construction fundamentals in the developing world.*

JI SERVICES

In specifics, Journeyman provides the following services:

1. Feasibility study - The Journeyman team assesses if the project can be construction at the specified location, overcoming all logistical concerns and within the projected budget.
2. Costs data analysis - Journeyman team's travel to the project location to procure material, labor and equipment price data. This step is crucial for developing an accurate estimate in a developing nation.
3. Conceptual Project Estimate - Prior to any official construction documents, J.I. assesses to project details to formulate a line item projection of the project costs.
4. Research - A Journeyman team will spend hundreds of hours researching the site, region, feasibility of project goals, and cultural considerations required for project success.
5. Schematic Design - Journeyman designers will develop schematic design concepts for the owner and building officials to review.
6. Final Design - Journeyman designers will create

construction-ready plans and specifications.

7. Construction analysis - The Journeyman project management team will develop the project schedule, budget, contracts, site logistics maps, safety plan, storm water pollution prevention plan, and evacuation plan.
8. Project Management - Journeyman will send a full time project manager to the field.
9. Grant Proposal - The Journeyman team will develop an extensive grant proposal for the project.

BUSINESS MODEL

In close partnership with several universities, the Journeyman business model relies heavily on the talent and labors of architecture, engineering, and project management students. By capitalizing on student thesis', senior projects, and accredited internships from California's best technical schools, the Journeyman business model thrives. These circumstances result in a higher quality of effort, research and passion than we find in the professional industry. All student projects are then review by licensed and professional tradesman.



THE PROCESS



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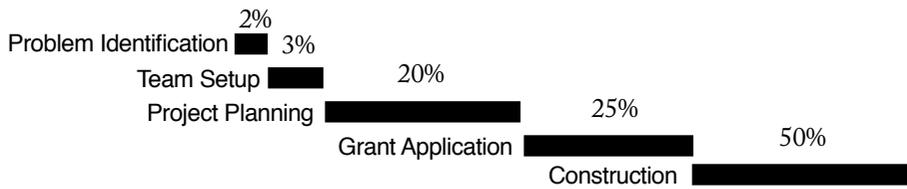


1. An NGO, like Seed of Health, defines a problem or need in a developing country. In this case, a healthcare facility in Bahir Dar, Ethiopia.

2. The NGO connects with Journeyman International to help develop the idea at full scale.

3. JI utilizes the resources from students and young professionals to develop a fully comprehensive project solution.

TIME LINE







A CLOSER LOOK AT THE CULTURE, RELIGIONS, POLITICS, ECONOMICS AND CLIMATE OF BAHIR DAR, ETHIOPIA

AFRICA'S OLDEST INDEPENDENT COUNTRY: ETHIOPIA

Located in the “Horn of Africa”, the country of Ethiopia is one of antiquity. The nation boasts a population of 90,873,739 people living in lands rich with cultural history.

Ethiopia's unique heritage has much to do with the fact that the nation has never been colonised, unlike many of its neighboring African countries. The integrity of the land and its people has endured for almost 2,000 years, and over 80 different ethnic groups have learned to coexist.

RELIGION

The majority of practiced religions in Ethiopia has fluctuated between Islam, Christianity, Judaism, and Paganism. Today, the prevalent religion is Christianity as practiced through the Ethiopian Orthodox Church.

POLITICS

In 1995 the Federal Democratic Republic of Ethiopia was established. Within the new constitution people were granted the rights to freedom of expression and press, the right to assemble, and the legal delineation that all citizens are created equal under the law. Ethiopia has served as a symbol of African independence and was one of the founding members of the United Nations.

These advancements in political structure have indeed helped to push the country into modern development, yet many issues in terms of economics and infrastructure have stunted further growth.

POLITICAL STRUCTURE:

- *Life Expectancy at Birth (LEB): 50.8 years*
- *Infant Mortality Rate: 97 per 1000 live births*
- *Under Five Mortality Rate (MMR): 500-700 per 100,000 live births*
- *Premature Death from all causes: 350 per 1000 persons*

Ethiopia relies on its agricultural sector to employ 85% of its people. Agriculture commodities such as cereals, pulses (legumes), oilseeds and most importantly, coffee produce more than half of the country's GDP. The tropical climate has proved to be highly conducive to the production of coffee beans. Ethiopia is internationally praised for providing some of the world's most delicious coffees. In fact, the country exports more coffee than any other commodity produced.

Given that the population is largely agriculturally based, it is estimated that 50 million people live in rural areas. Many of these people work as subsistence farmers, providing only what they need for their families. Others work for larger farms producing the commodities traded in the international marketplace. This agrarian lifestyle comes at a price, as the Ethiopian people are rendered susceptible to droughts and famines, while also suffering from a lack of infrastructure and inadequate access to health facilities.

All of these issues pose major threats to future development. As a whole, the country of Ethiopia is on the brink of modernization. In some of the larger cities, tourism flourishes. However, x-historical monuments

and profits from coffee exports are not enough to save a country dealing with major third world issues.

ECONOMIC STATISTICS:

- *GDP: \$94.76 Billion*
- *USA GDP: \$15.04 Trillion*
- *Main Industries: Agriculture (namely coffee, cereals, pulses, and oilseeds), Fishing*

Farmers of Ethiopia help to produce 45% of the nation's GDP.



A boy with his bicycle. Bicycling is a major source of transportation in Bahir Dar.



A young girl in a rural area of Bahir Dar. This type of stick and thatched roof structure is common on the area.





Left: A satellite image of Bahir Dar, located on the South shores of Lake Tana.

Right: A palm tree lined street in the heart of the city.



BAHIR DAR, ETHIOPIA

Bahir Dar is located at the southern tip of Lake Tana, in the northwestern Ethiopia. The city is the third largest in the country, and is also the fastest growing in the nation.

Bahir Dar grew around a Jesuit settlement in the 16th or 17th century and is now considered to be one of the leading tourist destinations in Ethiopia.

The city is known for its wide palm lined avenues and large variety of colorful flowers, as well as its distinctly tropical ambience. Bahir Dar has 7 cool months during the year where the temperatures range from 50° F to 68° Fahrenheit, and 5 warm months where the temperatures then jump to 68° F through 86° F. The best months for construction are January through May.

Considered to be one of the most well-organized and safe cities in Africa, Bahir Dar was awarded the UNESCO City for Peace Prize in 2002 for its ability to address the challenges of rapid socioeconomic development.

Despite this honorable award, Bahir Dar is still a struggling city aspiring towards new world technology while battling old world problems.

BAHIR DAR STATISTICS:

- *Population: 199,210*
- *Rank: 3rd largest city in Ethiopia*
- *Rural Population: 19,036*
- *Urban Population: 180,174*
- *Weather: 50° F to 86° F depending on season*





In a busy marketplace, citizens sell their and trade their goods, mostly agricultural commodities.



A view of the Blue Nile Falls, a major tourist attraction of the area.

A boy paddles across Lake Tana in a reed boat. The lake serves the people as a mode of transportation to other cities located around the lake.



LAND

Bahir Dar is considered to be a part of the Ethiopian Highlands. The lands are characterized by a rugged mass of mountains constituting the largest continuous area of its altitude on the entire continent. These distinct topographic features have earned it the nickname, “the roof of Africa.”

The city of Bahir Dar is situated on the south shores of Lake Tana, Ethiopia’s largest lake. With a surface area of 2,156 km², Lake Tana feeds the Blue Nile. Within the lake there are numerous islands. The beautiful Blue Nile Falls separate the lake and the Blue Nile, offering a distinct variety of fish fauna. The ecosystem of the lake is diverse with 70% endemic species and additional migratory birds who seasonally stay on the waters.

Within Bahir Dar, the people go through great efforts to reap the land as much as possible. Unfortunately, this has led to several forms of environmental degradation. Overgrazing, deforestation, high population pressure and inadequate land and water resource management practices are all issues that threaten the city’s industry.

INDUSTRY

What success the local industry has gained has much to do with the climate and surroundings. Locally, temperate weather has helped to produce a distinctive type of flora and fauna known as Afromontane. The montane grasslands and woodlands of this area have fertile soil that is heavily populated by farming communities. True to Ethiopia in general, Bahir Dar is largely based on agricultural production because of the valuable soils and proximity to water. However, due to poor, traditional and backward agricultural performance, millions of people still face food shortages, famine, starvation and malnutrition.



Lake Tana and its many species of fish and mollusks support a large fishing industry that produces 1.5 tons of fish yearly. Fishing comes second only to farming, allowing Bahir Dar to promote trade locally and throughout the country.

Favorable weather and natural landscapes also make Bahir Dar one of Ethiopia's most visited tourist attractions. Tourism also helps to support the people, as visitors from around the world flock to the shores of Lake Tana to immerse themselves in the rich Ethiopian culture, and of course to enjoy the coffee. The two main attractions in the city are the Tis Isat Falls (also known as the Blue Nile Falls) and Lake Tana. The Blue Nile feeds the Nile that runs through Egypt, and Lake Tana provides a source of life not just for fish and birds, but for the people of Bahir Dar as well. The Lake's Islands become more accessible during the dry season when the water levels are lower. These islands are famous for their monasteries. The monasteries represent a large portion of the Bahir Dar history, and for many of them women are not allowed inside.

INFRASTRUCTURE

Bahir Dar is connected to other cities in Ethiopia via the road system that provides bus routes as well as private car transportation. Taxis are used for getting around the immediate city, but the most common form of transportation is cycling. Located near the city is an airport that is equipped with paved runways which provides flights to the country's capital city multiple times a day.

An Ethiopian woman prepares coffee during a long traditional ceremony



An Oromo woman and her two children. The Oromo People are the most populous group in Ethiopia



Administratively, Bahir Dar is considered to be a Special Zone, located between two chartered cities (Addis Ababa and Dire Dawa). The Federal Police, the city police, and the local neighborhood militia provide safety for the city. The most common threat comes from hustlers that overcharge tourists for boat trips. On the other hand the daily and extensive weekend markets provide ample opportunity for safe cultural exploration for tourists and natives alike.

PEOPLE

Like all of Ethiopia, the people of Bahir Dar have a deep-rooted culture. It is evident in their traditions that these people place a high importance on respecting their elders. Most Ethiopian people live simpler lives as the city is just beginning to enter into modernity. They take part in very few indulgences with the exception of highly respected coffee ceremonies.

The coffee ceremony is an integral part of Ethiopian culture. It is said to be one of the most enjoyable experiences to take part in, and if you are invited to attend a coffee ceremony at one's house, it is a great honor.

Preparing “Bunna” (boo-na) as said by the Ethiopians, takes up to an hour and a half. It starts with a woman bringing out fresh washed beans and roasting them in a coffee roasting pan on a small open fire/coal furnace. Drinking of the coffee should be treated as a special event. Sipping slowly is important as it shows one's gratitude for the lengthy ceremony and delicious taste.

TRIBES

The three largest tribes in Ethiopia are the Amhara, the Oromo and the Tigray. The largest of these is the Oromo tribe with a population around 40 million; constituting of 32.2% of the total population of the country they are the single largest ethnic group in Ethiopia. Second is the Amhara tribe numbering about 23 million, making up 30.1% of the country's population. Third is the Tigray tribe which consist of 6.1% of the population of Ethiopia as a whole, and number about 5.5 million. As an interest to this project one of the other larger neighboring tribes is the Afar tribe. Their population consists of 1,276,867 people in Ethiopia (or 1.73% of the total population), of whom 108,488 are urban inhabitants.



The Oromo tribe is considered to be a Cushitic tribe. Cushitic speakers have occupied parts of northeastern and eastern Africa for as long as recorded history. Approximately 99% of the tribe lives in Ethiopia, with the remainder 1% living in the surrounding countries. A large part of their culture is gadaa: their society was traditionally arranged in accordance with gadaa, which was a social stratification method partially based on an eight-year cycle of age sets. Under gadaa, “every eight years the Oromo would hold a popular gathering called the Gumi Gayo, at which laws were established for the following eight years”. There is a democratically elected leader called the Abba Gada who is in charge of the system for the next eight-year term. The system of gadaa is no longer in wide practice but it still remains a significant part of the Oromo culture.

The Amhara tribe is a tribe that is a group of farmers that typically live in the north central highlands of Ethiopia. Approximately 90% of the tribe makes their living off of agricultural practices. They are a Semitic people whose ancestors possibly came from what is modern-day Yemen. The language that the Amhara tribe speaks is Amharic, the working language of the federal authorities of Ethiopia. Traditionally it is the

Amhara tribe that has dominated the country’s political and economic life. The main religion that is practiced by the Amhara tribe is Christianity.

The Tigray tribe lives in the northern highlands of Ethiopia’s Tigray province. The Tigreans have long been subject to the Amhara tribe and their rule and language. This is because the Tigreans and the Amharans share a common ancestry from the same group of Semitic speakers. The Tigray tribe lives in the northern highlands and although the predominant religion is Christianity, 1 in 10 practice Islam. The coffee ceremony is something that both the Amhara and the Tigray tribe share, and the Tigray tribe also finds its livelihood in agricultural roots and practices.

The Afar tribe is an ethnic group of people from the “Horn of Africa”: they live in similar areas to the Tigray tribe. Traditionally Afar society has been organized into separate and independent kingdoms, each governed and ruled by its own Sultan. The Afar tribe is one of the nine recognized ethnic groups in the country of Ethiopia. The Afar tribe is also part of the Cushitic branch of the Afro-Asiatic language family speaking the Afar language as their mother tongue. Traditionally The Afar The men of the Afar tribe carry a “jile” which is a famous curved knife and they have an extensive lit of battle songs. Additionally the Afar tribe is predominately Muslim, and they have a long history of association with Islam.

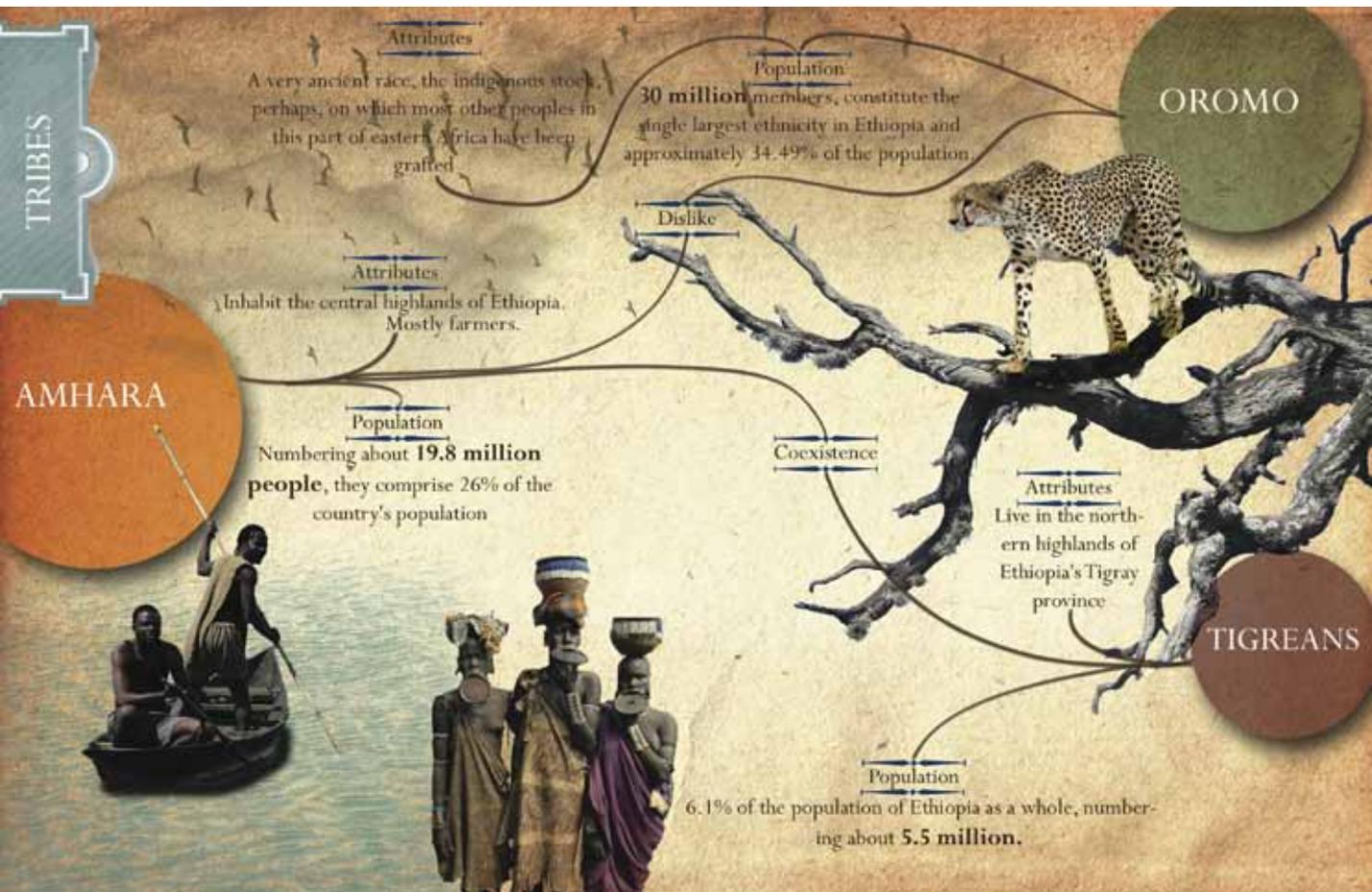


This young girl is from the Afar Tribe, one of the neighboring tribes in the Bahir Dar area.



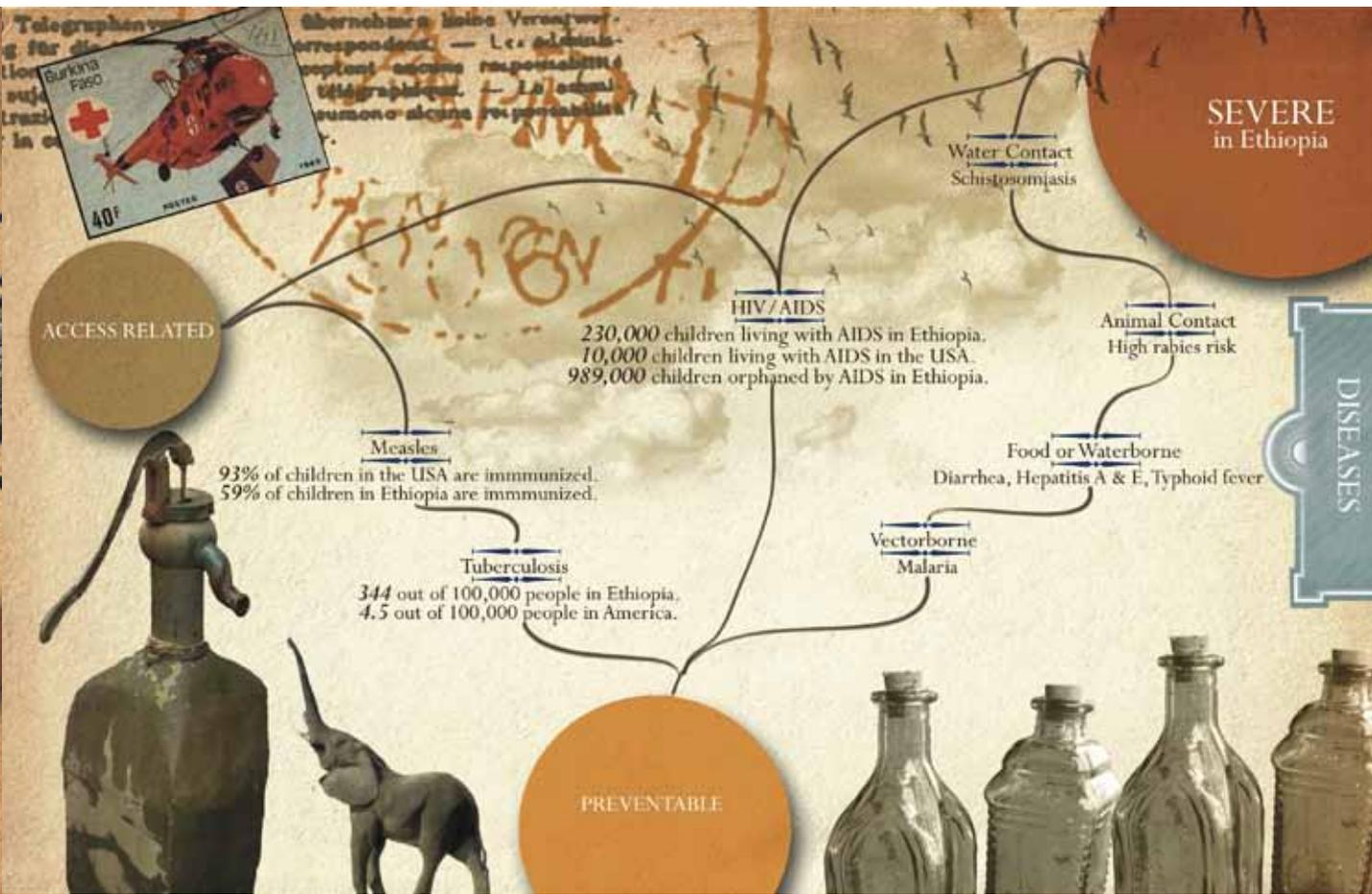
This group of people are from the Oromo Tribe, Ethiopia's most populous group.





CONCEPTUAL ANALYSIS: TRIBES

This image depicts the tribes that are located in and around the city of Bahir Dar, Ethiopia. The tribes that are shown here are the three largest, and most prevalent to the design and project: the Oromo, the Amhara, and the Tigray. By viewing this map one can understand more about the individual tribes and the relationships that they have with each other. By making this abstracted site analysis we are greater able to understand the relationships between aspects of the culture that will greatly influence the design decisions that we make.



CONCEPTUAL ANALYSIS: DISEASES

Depicted here are the various diseases in the city of Bahir Dar, Ethiopia that will be addressed either directly by the proposed hospital or indirectly via the ripple effect of increased healthcare in the region due to the implementation of this hospital. The most common diseases, preventable diseases at that, are diarrhea, malaria, HIV/AIDS, nutritional deficiencies, and acute respiratory infection. This map shows the relationships between diseases, causes and preventability. These relationships will help inform design decisions in regards to the use allocation in the hospital.





This group of people are from the Oromo Tribe, Ethiopia's most populous group.

EDUCATION

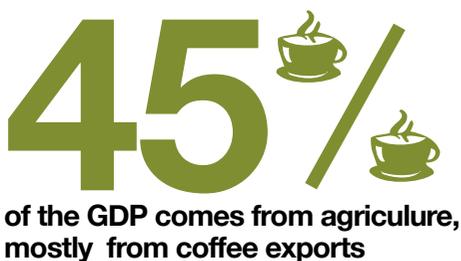
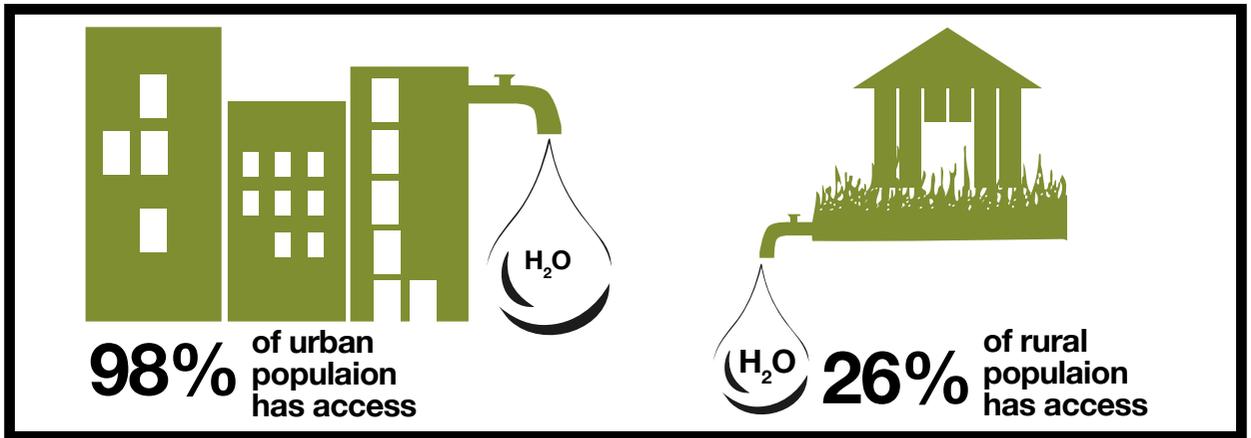
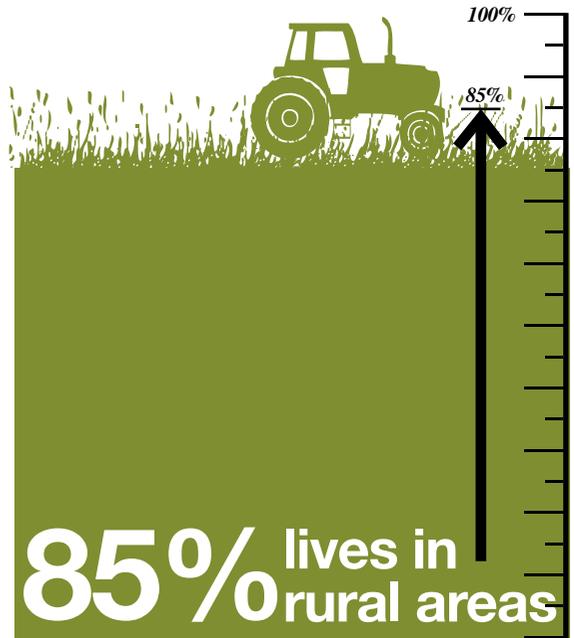
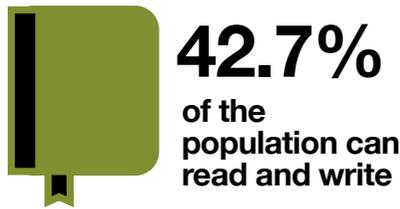
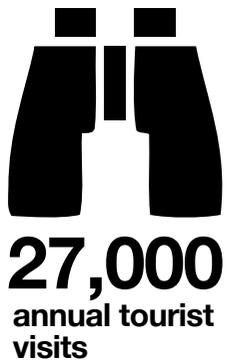
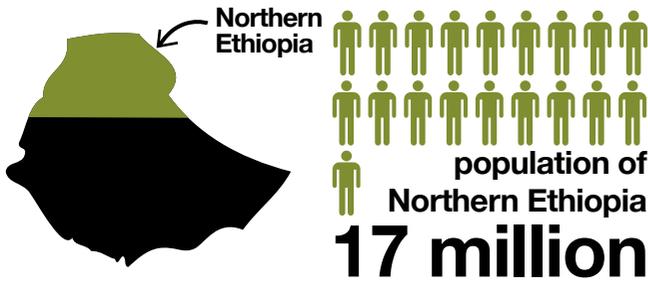
Education throughout the city and the country as a whole is at a very low standard. Although there are educational establishments, the quality of teaching and learning is poor. Many children complete only primary school where they are in classes with as many 65 peers with only one teacher and limited supplies. In general Ethiopians are at a major disadvantage in the educational realm. According to the CIA World Factbook only 42.7% of the population (ages 15 and over) can read and write.

Lack of education within Ethiopia compounds problems within the dismal healthcare structure and poor infrastructure, lowering their quality of life drastically.

Regarding higher medical education, Bahir Dar has a medical university which Seed of Health will partner with to help foster a stronger connection with the community and train the next generation of healthcare providers.

ETHIOPIA

NEED TO KNOW FACTS



Ethiopia has a democratic government...



PALE	LOW / PINK LOW / BLUE	ALLERGY PINK
NT	< 100	> 100
E	GRIZZLE	CRY
B	SOME TISSUE OF LIMBS	ACUTE PAIN EMERGENCY FLUID
VE	SLOW TERRIBLE	CRASH SEROLOGY

100-1000
PINK / BLUE
HYPERGLUCOSE

A healthcare provider in one of the few healthcare facilities. These facilities struggle to provide service to the people of Bahir Dar, as well as those who travel from far

HEALTH STATUS AND PROBLEMS



AN EXAMINATION OF THE DISEASES, ILLNESSES AND PROBLEMS AFFECTING THE ETHIOPIAN PEOPLE

A COUNTRY IN NEED

When compared to other regions in the country, the health status of Bahir Dar is extremely poor. These health problems are largely attributed to potentially preventable infectious diseases and nutritional deficiencies in addition to a high rate of population growth of 3.194% annually. Wide spread poverty among the vast majority of the population, low educational levels (especially among women), inadequate access to clean water and sanitation facilities, and poor access to health services have also contributed to the burden of ill health.

CURRENT PROBLEMS

The health status of the region is among the lowest in the world. Life expectancy at birth (LEB) is estimated at 50.8 years, the infant mortality rate 97 per 1000 live births, while the under five mortality rate (MMR) is estimated at 500-700 per 100,000 live births.

The total burden of diseases, as measured by premature death from all causes, is approximately 350 per 1000 persons. Pre-natal and maternal medical conditions such as acute respiratory infection, malaria, nutritional deficiencies, diarrhea and HIV/AIDS are the prevalent diseases in the region. Diseases that affect children

under the age of 5 years (acute respiratory infection, nutritional deficiencies and measles) account for one-third of MMR deaths. When prenatal and maternal conditions are added, the health problems of mothers and children combined account for about 50% of all deaths. Although largely preventable, childhood and maternal illnesses as well as communicable diseases are the major causes of deaths in the region.

HEALTH STATISTICS:

- *Life Expectancy at Birth (LEB): 50.8 years*
- *Infant Mortality Rate: 97 per 1000 live births*
- *Under Five Mortality Rate (MMR): 500-700 per 100,000 live births*
- *Premature Death from all causes: 350 per 1000 persons*

PREVALENT DISEASES

- *Acute respiratory infection*
- *Malaria*
- *Nutritional deficiencies*
- *Diarrhea*
- *HIV/AIDS*

Sanitary drinking water is hard to come by for many. Unsanitary drinking water is one of the leading causes of disease.



HISTORICAL INEFFICIENCY

The Ethiopian government considers healthcare to be a top priority and is committed to improving the healthcare status by utilizing all accessible internal and external resources.

Historically, the existing healthcare system has been unable to respond to the health needs of the people. It was highly centralized; its services were delivered in a fragmented way with reliance on vertical programs; and there was little collaboration between the public and private sectors. Consequently, the Ethiopian Transitional and Federal Government initiated political, economic and social changes resulting in the formulation of the 1993 Health Policy and Strategy: The federal government and the regional authorities currently seek to reorganize health services into more cost effective economic development efforts for the country.

In 1977 free medical care for the needy was introduced, however in 1993 only 55% of the population had access to health care services. During the 1970s and the 1980s Ethiopia was stricken with wars, drought, political turmoil and population explosions that left their lasting mark on the healthcare system.

In 2000 24% of the population had access to safe drink-

ing water and only 15% had adequate sanitation, and a year prior the public health care expenditures were estimated at 4.4% of the GDP. In 2001 the number of people living with HIV/AIDS was estimated at 2.1 million, and the number of people who died from HIV/AIDS totaled 160,000.

A LACK OF FACILITIES

Bahir Dar is a thriving city, with rapidly expanding social and economic activities. In many cases the demand for social services (such as health services, schooling, etc) surpasses the region's capacity to render the service. At present there is one referral hospital, two health centers and one clinic that are administered by the Regional Health Bureau. In addition there are some 21 privately owned primary health facilities.

Despite the presence of these facilities the health service coverage of the zone is still very low; it is roughly estimated at about 10% (computed by taking the physical norms by level of health service delivery). These facilities are also shared by people from adjoining zones, further widening the gap between the demand for health services and the existing supply of health facilities, creating a serious negative impact on the quality of the health services.



MOTHERS AND CHILDREN

Maternal care in Ethiopia is considered to be on the forefront of importance by many medical professionals. In 2012 the maternal mortality rate per 100,000 births was 470, compared with 589.7 in 2008 and 967.7 in 1990. Children under 5–mortality rate per 1,000 births are 470, and the lifetime risk of death for pregnant women is 1 in 40.

One of the issues that this project will address is maternal health in the region of Bahir Dar. Worldwide over 500,000 women and girls die of complications related to pregnancy and childbirth each year. Over 99% of those deaths occur in developing countries such as Ethiopia. In this country alone around 25,000 women and girls die each year to pregnancy related complications. However that number pales in comparison to the 500,000 women and girls who will suffer from disabilities caused by complications during pregnancy and childbirth each year.

These complications are experienced during pregnancy or delivery itself, but can also occur up to 42 days after delivery. Some of the causes include hemorrhage or

bleeding, infection, unsafe abortion, hypertensive disorders and obstructed labor. Conditions such as malaria, diabetes, anemia and sexually transmitted infections greatly increase a woman's risk for complications during pregnancy and childbirth and are therefore indirect causes of maternal mortality and morbidity.

Since most of these complications occur during childbirth and the postpartum period some of the steps to address these issues include emergency obstetric care, skilled birth attendants, postpartum care, and transportation to medical facilities if complications arise.

Mothers and their children are some of the main sufferers of disease and illness.





A mother and her child receive treatment at an HIV/AIDS treatment center. Only about 10% of ill persons end up obtaining treatment from the strained healthcare facilities.





Women and their children wait in line at the highly impacted healthcare facilities. Many of these women and children will not receive treatment for the medical issues they are dealing with.

FORCED TO IMPROVISE

The health service coverage of Bahir Dar is estimated at about 41%. The main reason for the poor health coverage in the region is the population's limited physical access to health facilities and healthcare professionals. This limited access combined with a lack of funds for modern services has pushed many Ethiopian people to traditional Ethiopian medicine. Unfortunately, this medicine is often times the work of less reliable traditional healers that use home-based therapies.

According to the CIA World Fact Book, 38.7% of the population lives below the poverty line. Many of these people do not have enough money to provide proper food, let alone healthcare. Thus, the allure of the traditional healers has gained widespread popularity. Although these healers provide ineffective treatment, they are much cheaper and accessible than modern medicine facilities. Some of the most common health problems that would be easily treatable with modern medicine go mistreated by the home healers. Traditional healers extract healing ingredients from wild plants, animals and rare minerals. These methods are no match for the life threatening conditions like HIV/AIDS, malaria, and acute respiratory infection.

ILL AND UNINFORMED

A lack of education also works against the Ethiopian people who are trying to gain healthcare. In some parts of the country it is common belief that there are two main causes of disease; God's will or unclean drinking water and unsanitary food. Although these may very well may be valid causes of the existing health problems, other causes go largely unaccounted for. Many people are unaware that the diseases they suffer from are communicable. The prevalent diseases are mostly preventable. However, a lack of awareness allows the diseases to spread.

Modern medicine is very much an intangible resource for these people. In fact, only 14% of the urban population utilizes healthcare facilities compared to only 9% of the rural population who utilize healthcare facilities. A lack of access, low levels of education, and the high price of healthcare keep these people from the help they need.

HEALTH STATUS AND PROBLEMS

NEED TO KNOW FACTS



50.8 years
life expectancy at birth



under five mortality rate:
500-700/
100,000
live births



infant mortality rate:
97/1000
live births



350/1000
premature deaths from
all causes



10%
of ill persons
receive treatment

25 existing facilities in Bahir Dar



1 referral
hospital

+



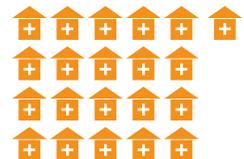
2 health
centers

+



1 health
clinic

+



21 privately
owned facilities

are struggling to serve over **200,000** people

prevalent diseases:



nutritional
deficiencies



HIV/AIDS
890,000 adults
92,000 children
suffer

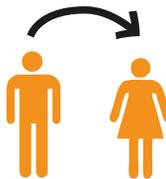


acute
respiratory
infection



malaria

causes:



interpersonal
transmission



unsafe
water



lack of
education



lack of
sanitation
facilities



An Ethiopian woman being treated in a local hospital for Obstetric Fistula, a preventable condition that occurs amongst young women who give birth.

DEMAND ASSESSMENT



AN OVERVIEW OF THE NEED AND POTENTIAL FOR SOLUTIONS IN BAHIR DAR, ETHIOPIA

OBJECTIVE

This project seeks to build and finance a teaching hospital in the impoverished and underserved city of Bahir Dar. The main objectives are to increase the availability of medical and healthcare services and to establish technical schools to train healthcare providers in the communities.

DEMAND

As previously outlined, there are only four government run health facilities (one referral hospital, two health centers and one clinic) and 21 privately owned primary health care facilities to serve over 200,000 people. To make the health service coverage even worse, the one referral hospital has a very large coverage zone that is not even limited to Bahir Dar as thousands of people from neighboring cities and rural areas travel to Bahir Dar seeking medical attention.

According to the Ethiopian Review, a local news source, 80% people are suffering from preventable diseases, such as malnutrition, in this region. Of those who are able to make it to a health clinic, only 10% of them actually receive treatment for their problem. The number of sick people is continuously growing as access to proper care and education is very limited.

EXISTING FACILITIES:

- 21 Privately owned primary health care facilities
- 1 Government Run Health Facility
- 1 Referral Hospital
- 2 Health Centers
- 1 Clinic

TOTAL FACILITY CAPACITY:

- *University of Bahir Dar: 300-400 patients/day*



CURRENT EFFORTS AND GOALS

The Ethiopian Transitional and Federal Government initiated political, economic and social changes resulting in the formulation of the 1993 Health Policy and Strategy: The federal government and the regional authorities currently seek to reorganize health services into more cost effective economic development efforts for the country.

As indicated in this health policy document, the Ethiopian government considers health care to be a top priority and is committed to the attainment of these goals utilizing all accessible internal and external resources.

According to the United Nations, the Country's Development Frame Work and Plan of Action 2001-2010 has envisaged:

GOVERNMENT PLAN OF ACTION:

- Reducing the *infant mortality rate (IMR)* from 97 to 63 per 1000
- Reducing the *under-five child mortality rate (CMR)* from 167 to 63 per 1000
- Reducing the *maternal mortality rate (MMR)* from 775 to 380 per 100,000
- Improving access to *health services (AHS)* from 51% to 74%
- *Increasing child immunization (CI)* from 60% to 9

Cognizant to this vision, government health policy highly encourages the participation of the private sector and NGO's in the provision of health care.

UTILIZATION OF EXISTING FACILITIES

The total outpatient utilization of public health facilities in the country suggests that on average there are about 0.25 visits per person per year. A Policy and Human Resources Development Project (PHRD) study reveals that only 10% of ill persons obtained treatment for their condition from any health facility (private or government).

Only 9.5% of the rural population utilizes health facilities as opposed to 14% of the urban population. According to the PHRD study the three most important factors pertaining to seeking treatment are:

- The cost of the treatment
- The availability (distance) and quality of service
- The parent's level of education

The health service coverage of the Bahir Dar Special Zone is estimated at about 41%. The main reason for the poor health coverage in the region is the population's limited physical access to health facilities and health care professionals.

EFFECTS OF A NEW FACILITY

The implementation of a new hospital in this area will contribute to making these figures a reality. The Health Center is envisaged to serve the inhabitants of Bahir Dar and the surrounding rural and urban Keble's. During the first three years of its operation, the Health Center is expected to provide service for 40-100 persons every day and from the fourth year onwards the service capacity will increase to 100-250 persons a day.

In order to meet the investment objectives above Seed of Health has planned to equip the nascent health center with standard up-to-date medical equipment and facilities. Medical staff to provide quality service will be recruited and placed. The major services of the Health Center are outlined in a two phase plan.

PHASE 1 WITHIN FOUR YEARS:

- *Outpatient Medical Service*
- *HIV/AIDS Counseling & Testing*
- *X-ray Service*
- *Ultra-Sound Examination*
- *Mothers & Children Health Care Service*
 - *Immunization*
 - *Prenatal & Postnatal Service*
 - *Delivery*
- *Reproductive Health & Family Planning*

PHASE 2 WITHIN EIGHT YEARS:

- *Minor Operation/Surgical Service*
- *Inpatient Treatment*
- *Pharmaceutical Services*
- *Ambulance Service (for Emergency)*
- *Psychiatric Service*
- *Laboratory Service*

INITIAL PROJECTED PATIENTS AND RELATED SERVICES:

- *HIV/AIDS: 2~10 people per day*
- *Pregnant Women and New Mothers: 15~40 people per day*
- *Acute Preventable Illnesses and In-Need-of-Pharmaceutical Services (common cold, flu, etc): 10~30 people per day*
- *Minor Injuries: 6~10 people per day*
- *Immunizations: 7~10 people per day*





A doctor helps a woman and her child during a hospital check-up.

DEMAND ASSESSMENT

NEED TO KNOW FACTS



Proximity to other Facilities

*This 2.5 mile by 1.75 mile portion of Bahir Dar is located approximately 3 miles from the heart of the city

nearest facility:
Abay Health Center
 approx: 1.28 miles from site

projected patients phase 1:

**HIV/
AIDS:**



up to **10**
patients/
day

**Pregnant &
new mothers:**



up to **40**
patients/
day

**Acute
preventable
illnesses:**



up to **30**
patients/
day

**Minor
injuries:**



up to **40**
patients/
day

Immunizations:



up to **40**
patients/
day



rural:
9.5% utilize
 health facilities



urban:
14% utilize
 health facilities



average:
1 visit for every
4 years/person



CASE STUDY



CURRENT OPERATING DATA FOR AN EXISTING FACILITY IN BAHIR DAR, ETHIOPIA

On average, the clinics used for this case study served 200 patients per day. Most patients were admitted for infectious diseases such as TB, HIV/AIDS, Malaria and other locally endemic diseases. These clinics also specialized in Adult and Pediatric Out-Patient procedures, and Reproductive Health services. Minor surgery, with emergency services were also provided. The table below provides the annual manpower expenses of the clinics.

NUMBER AND TYPE OF STAFF MEMBERS AND THEIR SALARIES: 17 BIRR= \$1 US DOLLAR

Conversion: 17 Birr = \$1.00 US			
Type of Professional	Number	Salary of Junior Professional	Salary of Senior Professional
Clinical Nurse	8	2000 Birr	3000 Birr
Mid Wife	3	2000 Birr	3000 Birr
Health Officer	2	2000 Birr	3000 Birr
Pharmacist	2	2000 Birr	3000 Birr
Lab Technician	3	2000 Birr	3000 Birr
Cardiologist / HMIS	3	2000 Birr	3000 Birr
Radiologist (X-Ray and Ultrasound)	1	2500 Birr	3500 Birr
General Practitioners	2	6000 Birr	7500 Birr

**SPECIALIST INCOME WILL BE DETERMINED FROM THEIR
PERFORMANCE (40-60%)**

Specialists (Income determined from performance)			
Type of Specialist	Number	Type of Employment	Percentage of Patient Payment
Ophthalmologist	1	Part-time	50%
Orthopedic	1	Part-time	50%
Gynecologist	1	Part-time	50%
Surgeon	1	Part-time	50%
Dermatologist	1	Part-time	50%
Neurologist	1	Part-time	50%
Internist	1	Full-time	50%
Gastrointestinal	1	Full-time	50%
Ear, Nose and Throat Specialist	1	Part-time	50%
Pediatrician	1	Part-time	50%

Support Staff	Number	Average Salary
Storekeeper	1	1500 Birr
Finance and Administration Officer	1	3000 Birr
Cashier	1	1500 Birr
Accountant	1	2000 Birr
Card Clerk	2	1000 Birr
Janitors	2	700 Birr
HMIS (Health Management Information System)	1	1500 Birr
Driver (Ambulance)	1	1500 Birr
Guards	2	900 Birr

QUESTION: WHAT IS THE NUMBER OF INPATIENTS VS. OUTPATIENTS?

200 out patients and 20 inpatients

WHAT IS THE NUMBER OF PATIENTS TREATED (DAY/MONTH/YEAR)?

On average 150 -200 patients/Day, 4000- 6000 patients/month. This number increases with malaria or other epidemic outbreaks.

WHAT ARE UTILITIES COSTS FOR LOCAL CLINICS?

The table below provides monthly expenditures on utilities. Phone/internet service cost vary depending on the individuals/hospitals consumption. The data provided below is the average expense of the clinics surveyed:

Utilities	Average Monthly Cost
Electricity	1500 Birr
Water	700 Birr
Phone	800 Birr
Internet	740 Birr
Cleaning Materials / Disinfectants	1500 Birr

WHAT ARE ESSENTIAL MEDICATIONS TO KEEP IN STOCK AT ALL TIMES?

The table to the right provides a list of 11 essential drugs selected by WHO and ministry of health which are to be available 24 hours a day 7 days a week.

Essential Medicines
Amoxicillin
Oral Rehydration Salts
Arthemisin / Lumphantrine
Mebendazole Tablets
Tetracycline Eye Ointment
Paracetamol
Refampicine / Isoniazide / Pyrazinamide / Ethambutol
Medroxyprogesterone (depo) Injection
Ergometrine Maleate Tablets
Ferrous Salt plus Folic Acid
Pentavalent DPT-Hep-Hib Vaccine



WHICH ITEMS ARE SUGGESTED TO KEEP IN STOCK IN THE PHARMACY?

In addition to the tracer drugs, different kinds of antibiotics and analgesic drugs should be available for the target population to control the types of locally endemic diseases in the area. Some of these drugs are as follows:

Drugs useful for treating infections Like Ciprofloxacin, CAF, Augmentine, Ampicilline,
Drugs useful for treating parasites Vermox, Tindazol, Albendazol,
Drugs useful for family planning OCP, post pills,
HIV/AIDS (ART, PMTCT) drugs,
Different types of pain killers like Hyocin, Declofenac

Different multi vitamin and multi mineral supplement drugs for pregnant women and children should also be available.

WHAT ARE YOUR PATIENT FOOD COSTS?

Almost all clinics do not provide food for their inpatient clients. For reference, an average meal is 50 Ethiopian birr.

WHAT IS THE HEALTH INSURANCE SITUATION IN ETHIOPIA?

Currently there is no medical insurance in Ethiopia, but community health insurance is to be implemented soon.

IS MALPRACTICE INSURANCE REQUIRED IN ETHIOPIA?

No.

WHAT ARE THE REQUIREMENTS AND COSTS FOR DEALING WITH BIOHAZARD AND MEDICAL DISPOSAL?

Incinerator Placenta pit and Dry waste disposal system for burning dry waste are available .There should be separate garbage cans for infectious and noninfectious wastes in every treatment area and in the compound. There should be safety boxes for sharp materials. Average monthly cost of municipal waste disposal is 400 Ethiopian Birr.

IS BIOGAS USED?

Biogas fuel was introduced in Bahir Dar three years ago. It is cheaper than other kinds of fuels like kerosene, charcoal, and fuel wood.

BASIC MEDICAL EQUIPMENTS NECESSARY IN DIFFERENT KEY TREATMENT AREAS IN THE CLINIC:

Room Type	Number of Rooms	Number of Patients Per Day	Equipment Needs
Medical Records (MR)	1	(patient check-in and registration)	Card files, shelves for MRs, table and chairs, computer and printer
Delivery (Pre-Delivery and Post-Delivery)	2	(At Most) 5	and scale, suction equipment, sharps and infectious waste containers, MVA, Personal
ANC	1	20	Office equipment (desk, file cabinets, etc), exam table and screen, HIV testing Kit
Adult OPD	3	100 to 150	Provider desk and chair, exam table and screen (1 set in each room), weight scale, BP apparatus
Pediatric OPD	1 or 2	30	Provider desk and chair, exam table, baby scales
VCT / HCT	1	10	Office equipment (desk, cabinets, etc), scale (weight and height)
(EPI) Vaccination	1	5	Office equipment for provider stations (desk, file cabinets, etc), refrigerators
Inpatient Ward	1	10	Beds (with mattresses) and bedpans
Minor Procedure Room	1 or 2	2	Exam table and screen, provider desks
Emergency Room	1	5	Exam table and screen, treatment beds
Pharmacy (Store and Dispensary)	2	(all patient prescriptions)	Office furniture (desk, chairs, shelves), refrigerator
Laboratory	2	(all patient lab tests)	Autoclave (1), Centrifuge (2), Hematocrit Machine (1), Microscope (2 or more), Refrigerator (1)

14 (1.0 kg.) Packages
Net Wt. 14.0 kg (30.8 lb)



HARV

14 (1.0 kg.) Packages
Net Wt. 14.0 kg (30.8 lb)

CASE STUDY



A BRIEF REVIEW OF AN EXISTING FACILITY IN ADDIS ABABA, ETHIOPIA

INTRODUCTION

The following case study has been gathered from the United States Agency of International Development- USAID Department. This department has been responsible for the implementation of a new program called Breedlove. Breedlove aims to help Ethiopian women who are living with HIV, through a variety of resources at the Gandhi Hospital in Addis Adaba, Ethiopia. Journeyman International has selected to use this case study as it examines the infrastructure, successes, and challenges of this facility. Through comparison and analysis, Journeyman International has gathered important information which can be applied to our project.

THE BREEDLOVE PROJECT

Food Secure and *HIV-Positive* in Ethiopia began in 2006 as a supplementary feeding intervention supported by a small, one-year grant to Project Concern International (PCI) from the U.S. Agency for International Development's (USAID) International Food Relief Partnership (IFRP). The women and hospital staff call the project "Breedlove," in reference to the lentil and potato blended soups (manufactured by Breedlove Foods Inc.) that are distributed to project participants. The grant has

been re-awarded annually since 2006: IFRP provides the food and a cash budget to support administrative costs for distributing the soup, but very little for complementary programming.

Working closely with hospital staff, PCI designed the project to complement the prevention of mother to child transmission of HIV (PMTCT), Antiretroviral Therapy (ART), nutrition assessment, education, and counseling services that women and children living with HIV receive during hospital and health facility visits. As the project gathered momentum, PCI deliberately linked the soup distributions to its coffee ceremony and agriculture activities to ensure that nutrition supplementation does not stand alone. Thus, this linkage intentionally integrates HIV programming (ART and PMTCT) with Food and Nutrition Service (FNS)z programming in a manner that addresses both short-term and long-term needs of these households.

More specifically, the project is comprised of three components: 1) distribution of highly nutritious foods to address short-term nutritional needs; 2) holding coffee ceremony discussions to provide emotional support and education around HIV and FNS; and 3) promot-

ing urban agriculture, including vegetable gardening and poultry raising, to address longer-term nutritional needs. The project's overall aim is to reduce vulnerability to malnutrition and food insecurity among households affected by HIV.

Activities target two groups in Addis Ababa: 1) pregnant or lactating women living with HIV who are heads of households and attending a PMTCT program in one of the 16 participating health facilities in Addis; and 2) parents and/or caregivers of children who are living with HIV, under the age of 12, and attending a pediatric ART program in one of the five participating hospitals in Addis.

WHAT WORKED WELL:

FOOD AS AN ENTRY POINT FOR INTEGRATED PROGRAMMING

Linking monthly health care visits to food distribution is an effective strategy for ensuring optimal uptake and retention of HIV and FNS services (i.e., ART, PMTCT, nutrition assessment and counseling, coffee ceremonies, and urban agriculture). A strong referral network between each of the activities described above, along with intentional discussions about the benefits of each of these services during food distributions, is key to ensuring that they are tangibly integrated, and not just connected on paper.

WOMEN SPEAKING TO WOMEN

When the health staff and PCI team speak at coffee ceremonies, the women listen. But when one of the women participants stands up and tells her story, they really listen. They are engaged and extremely supportive of one another. They often comment on how much they learn from each other's experiences; they remember the stories and the messages that are integrated within them. For this reason, the facilitators frequently invite and encourage the participants to stand and share their experiences on given topics. Some participants have even become PCI peer educators.

CAREFUL TIMING

PCI learned through trial and error that the timing of ceremonies is critical. Given the frequency of holidays and social events in this culture, and the two- to three-hour duration of a typical ceremony, the date and time need to be carefully selected for optimal turnout.

SKILLED FACILITATION

Facilitation also needs to be effective to guarantee attendance. When certain members dominate the session, other participants are discouraged and may not return. A strong facilitator is therefore crucial to managing the discussion and ensuring that it remains fruitful, inclusive, and relevant to participants' lives.

CHALLENGES:

WIDESPREAD POVERTY

Women participating in the coffee ceremonies said that while they now understand the need for nutritional diversity, they often cannot afford the variety of foods recommended. Vegetables, fruits, milk, and other suggested foods are more expensive than the ingredients for injera (the traditional grain-based bread), so they frequently default to foods they know and can afford. This demonstrates that while behavior change can result from acquiring new knowledge, the change must also be economically accessible.

LONG DISTANCES

For many clients, traveling to one of the five central hospitals to receive treatment can be inordinately time-consuming and expensive. Hospitals are currently trying to refer them to health centers that are closer to home, but because they fear stigma and discrimination, beneficiaries often prefer to travel long distances so that they will not see neighbors and friends. Participants often cite travel costs as a reason for missing appointments.

LACK OF SUPPORT FOR MONITORING AND EVALUATION (M&E)

The limited budget attached to the soup distribution makes it difficult to establish a comprehensive M&E system. A quarterly review meeting takes place, and informal interviews with beneficiaries are held sporadically by M&E staff from other PCI programs (who are “borrowed” by the Breedlove project). Unfortunately, formal monitoring against indicators for the objectives of each project component is not done in a systemic or comprehensive manner. In particular, the project does not review the attendance records of women receiving PMTCT or children’s adherence to ART, and so cannot empirically assess whether these adherence objectives have been met. Instead, there is heavy reliance on anecdotal evidence. The project recognizes the need to improve its M&E system and is working to do so.

OVERBURDENED HEALTH CARE STAFF

Distributing the Breedlove soup became an additional task for already stretched health workers at the distribution sites. The scarcity of qualified health professionals is a systemic problem throughout the country. Those handling the Breedlove commodity complain of being overworked and underpaid. The implications are insufficient communication about the commodity and the intention that it be consumed only by the targeted recipient (the pregnant/lactating mother or child living with HIV). Similarly, the urban agriculture program is not as thoroughly promoted during distributions as it could be.

STIGMA AND DISCRIMINATION

Stigma and discrimination remain significant problems in Ethiopia. In fact, many women who were photographed for this case study did not want their identities known for fear of discrimination within their communities. Stigma affects various aspects of the Breedlove project: women do not want PCI staff visiting them in their homes (to provide technical support or monitoring, for example) for fear that neighbors will suspect their status. Many women intentionally attend health clinics that are far from their homes where they will not see neighbors or be visited by health staff. Stigma exists not only at the societal level, but also within households. Women in coffee ceremonies frequently note that they do not tell their husbands that they are bringing the children for treatment or that they are attending coffee ceremonies at the hospital. Many say that their husbands left them once they discovered their HIV status.





A satellite image of the 11th Kebele of Bahir Dar. Lake Tana is located just two miles east of the site, highlighted in yellow
Right: A palm tree lined street in the heart of the city

LOCATION & SITE ANALYSIS



EXAMINING THE PROPOSED PLOT OF LAND AND SURROUNDING AREAS

SITE

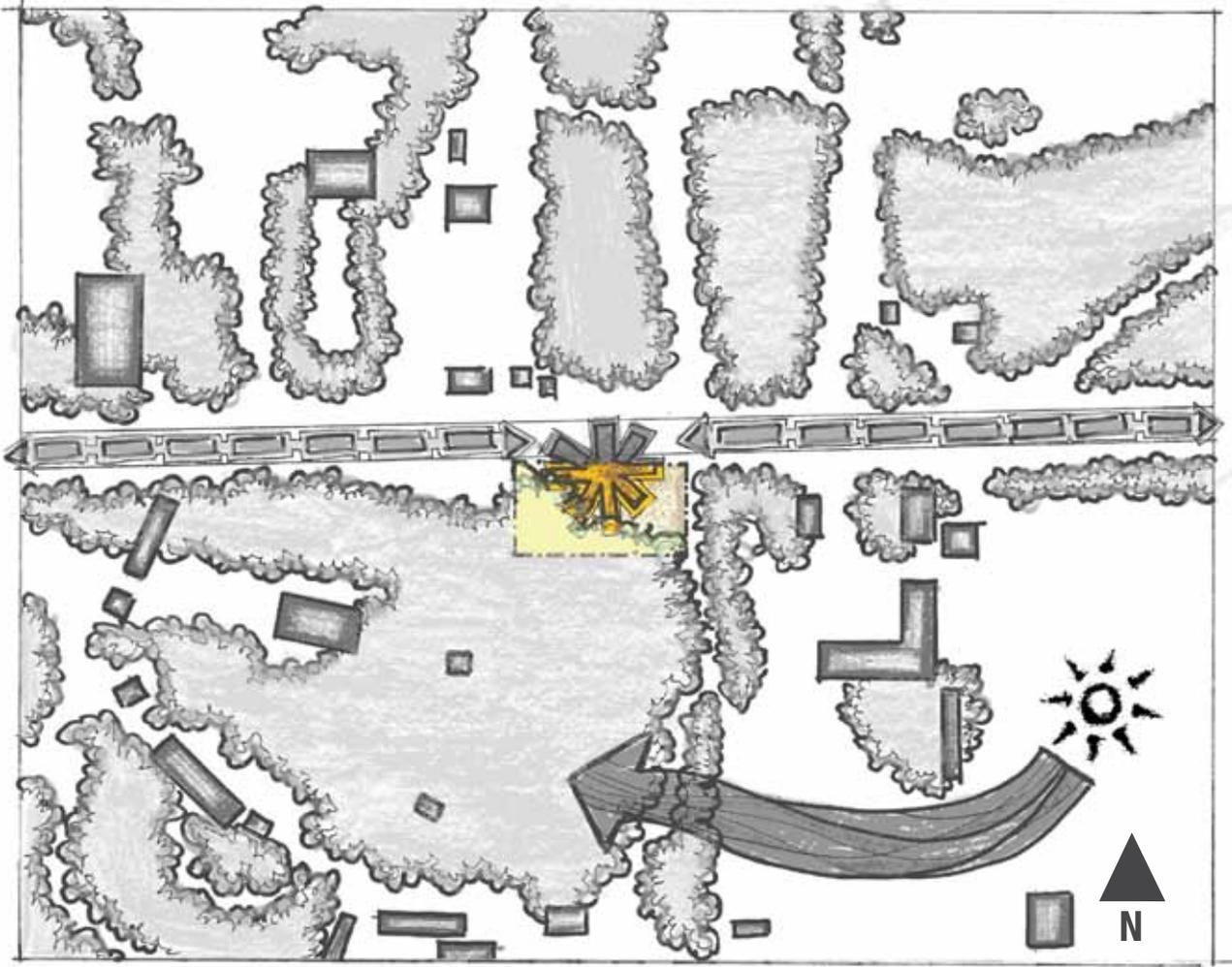
The parcel of land that has been donated to this project is located in the 11th kebele of Bahir Dar. Kebeles are neighborhoods, and the 11th kebele is located to the east of Lake Tana, across the Blue Nile.

The road Highway 3 runs through the city of Bahir Dar in a west-east pattern and forms the northern boundary of the site. The dimensions of the site are approximately 45 m by 60 m, which results in 131 ft by 213 ft. The parcel of land is 27,903 sq feet, and roughly one third of that is unobstructed of existing trees and vegetation and consists primarily of transitional type between alkaline and tholeiite basalt soil.

The sun pattern moves from east to west across the site, with more direct sunlight on the southern angle of the site vs the north because of the sites location above the equator.

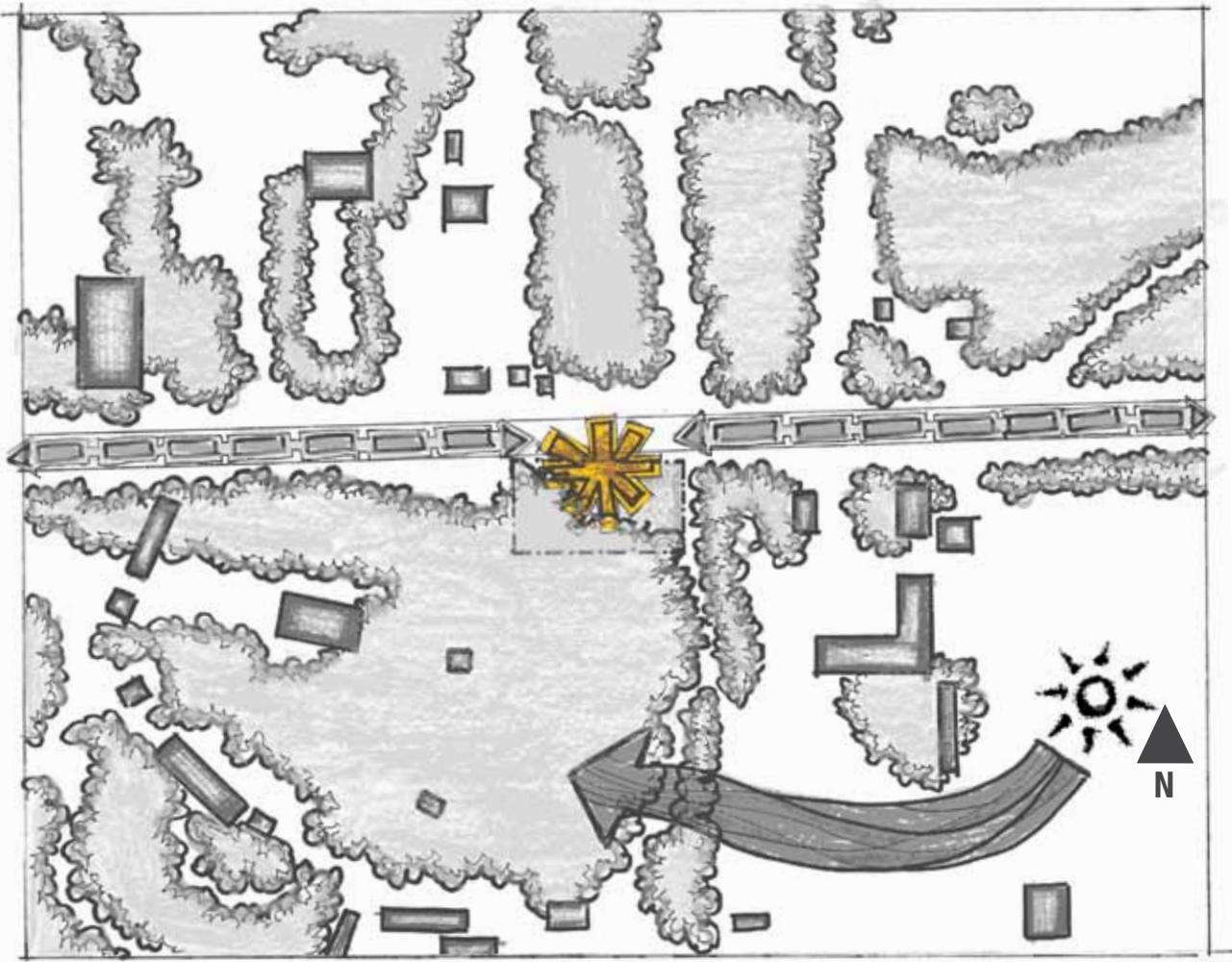
Currently there are no existing built structures on the site, and one of the existing land uses to the west of the parcel is a mosque.

The distance from the site to the center of the city is approximately 6.1 km and takes roughly 6 minutes to travel by car.



OUR SITE

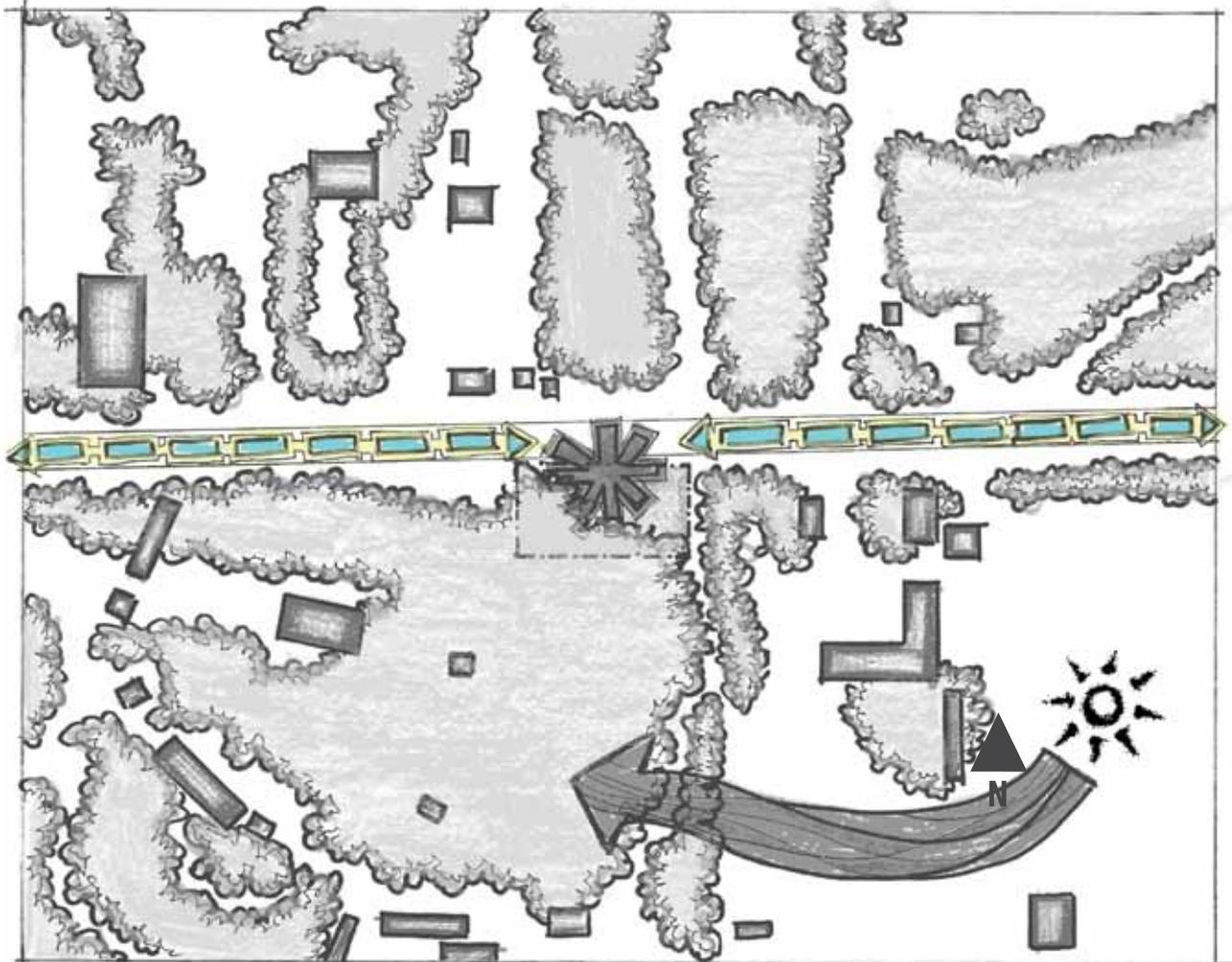
The parcel of land donated to Seed of Health for this project is located in the 11th kebele, or neighborhood of the city of Bahir Dar, Ethiopia. This parcel is located across the Blue Nile River, to the east of the heart of the city. It measures 40 m by 65 m, and is approximated to have a 5% slope. The road Highway 3 forms the northern border of the site, with existing land uses surrounding the remaining three sides.



ACCESS

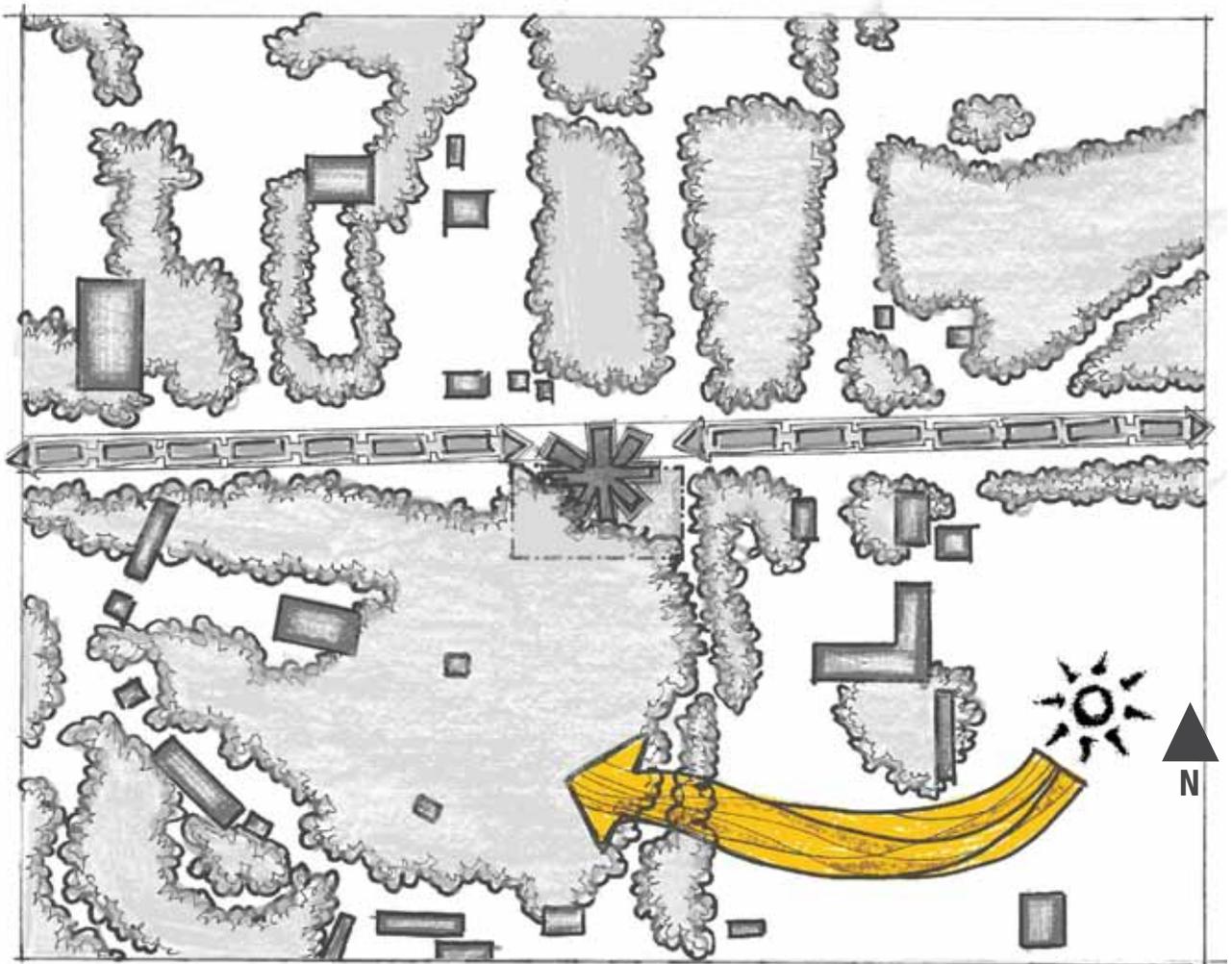
Access to the parcel of land is illustrated here with the asterisk, with access being primarily from the highway running to the north of the site. Vegetation and neighboring land uses surrounds the remaining three sides of the site, providing no vehicular access. However it is possible to have pedestrian and wildlife access on the remaining three sides.





CIRCULATION

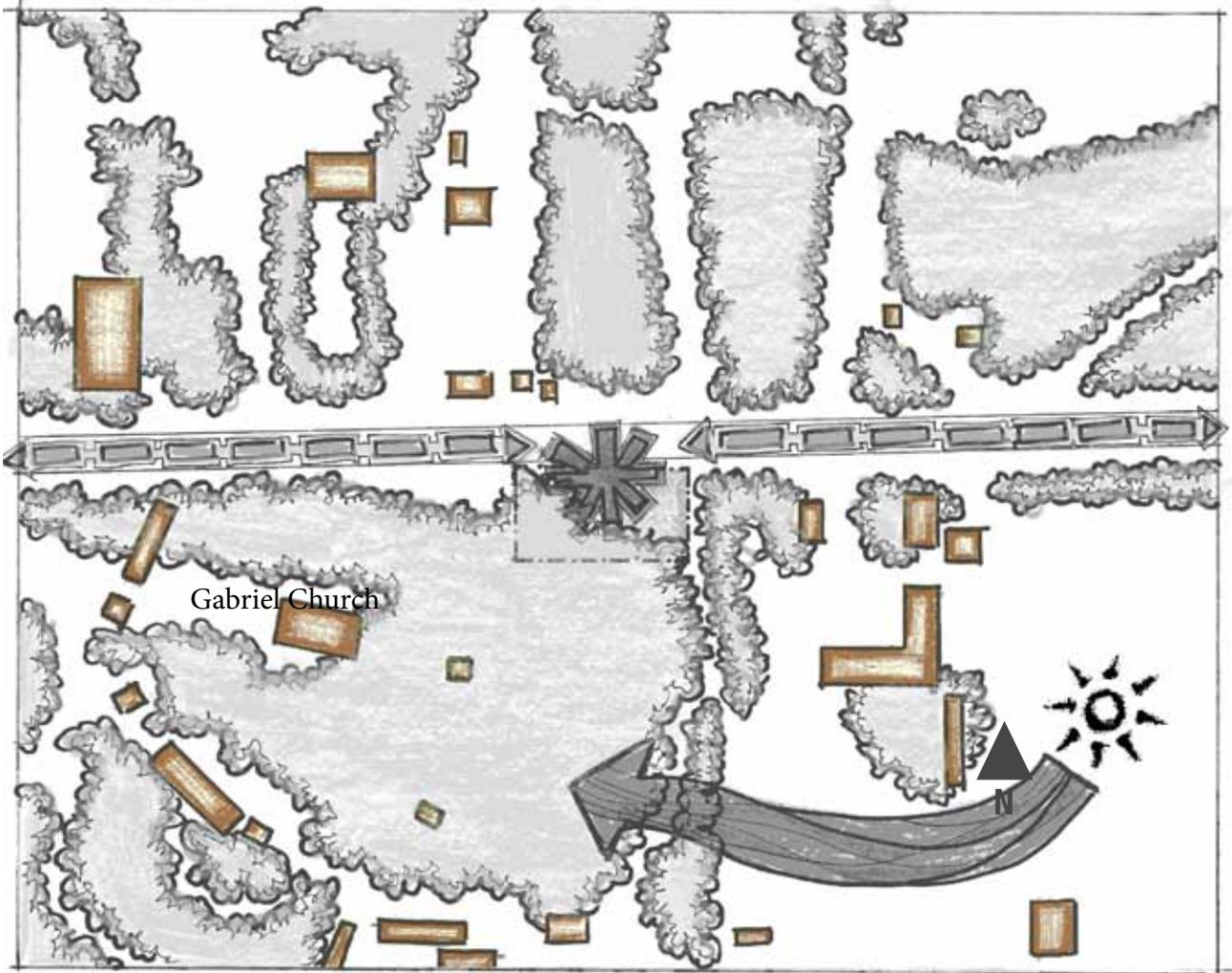
The primary form of transportation in Bahir Dar is the bicycle, with the second most common being the three-wheeled rickshaw known as a bajajs. Out here on the outskirts of the city the most common form of transportation is by car or bicycle. The Highway 3 that runs to the north of the site in an East/West fashion supports two-way traffic and carries commuters to the heart of the city or away into the countryside. The road is one of the only ones in the area around our site and is heavily used.



SUN PATTERN

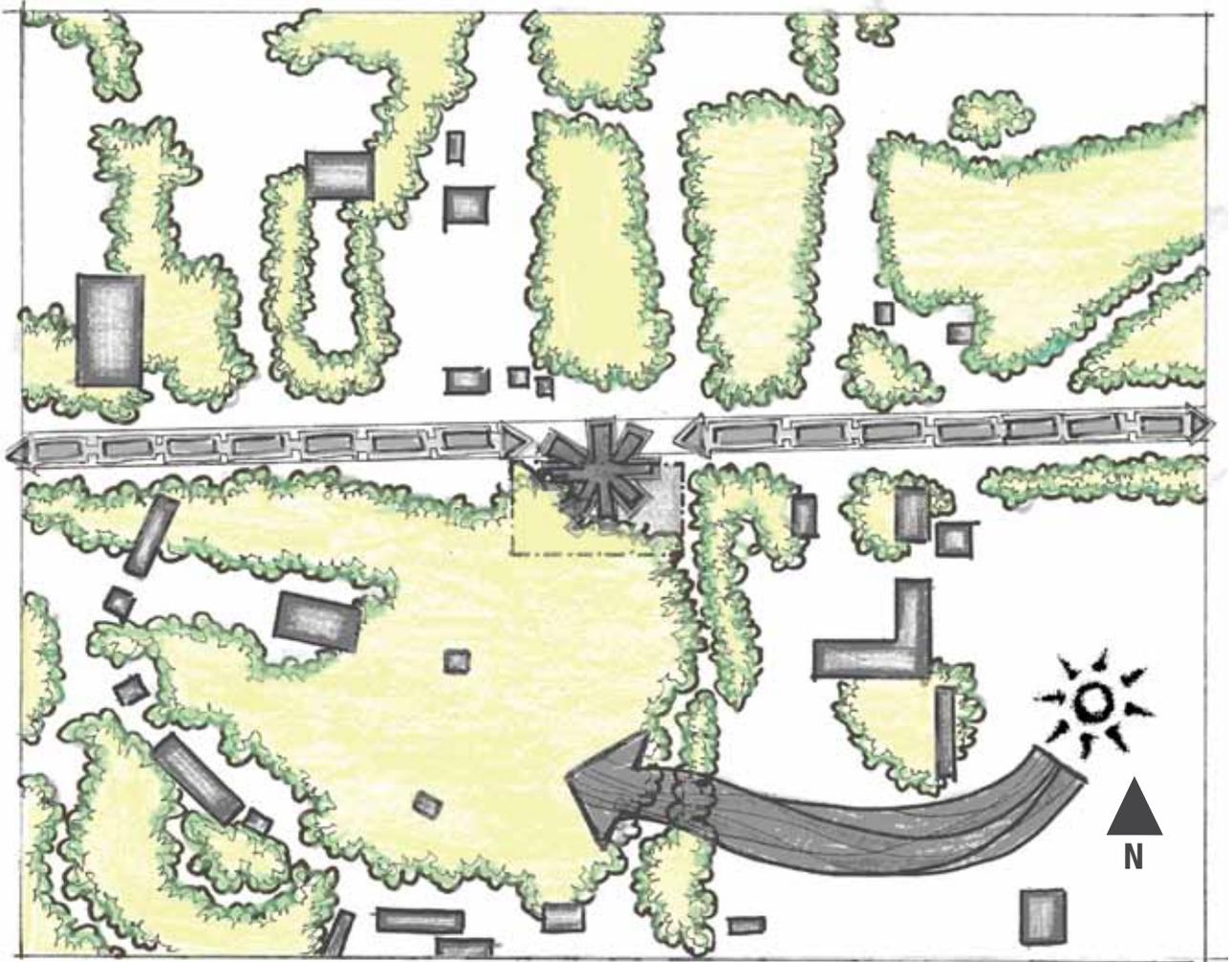
The sun follows the pattern of westward movement across the site. Because Ethiopia is in the Northern Hemisphere the sun angles are relatively similar to the ones that are found in North America, comparatively. Southern sunlight is direct and intense, while northern sunlight is indirect and softer. The analysis being that windows should be greater on the northern side of the building and open southern facades should be shaded or screened.





EXISTING SURROUNDING STRUCTURES & LAND USES

In this image the surrounding structures and buildings are indicated, although no specific land use information is conclusive. It can be deduced that a majority of the surrounding parcels of land are residential or agricultural in use. However it is known that one of the larger surrounding buildings is a church.



VEGETATION

This image depicts the surface of the land occupied by vegetation. Bahir Dar is situated in what is known as the Ethiopian Highlands. The Ethiopian Highlands share a similar flora and fauna of other mountainous regions of Africa; this distinctive flora and fauna is known as Afromontane but from the time of the last Ice Age has been populated with some Eurasian flora. Specifically this portion of Bahir Dar falls into the region known as the Ethiopian Montane Grasslands and Woodlands.

The Ethiopian montane grasslands and woodlands is the largest of the highland ecoregions, occupying the area between 1800 and 3000 meters elevations. The natural vegetation is closed-canopy forest in moister areas, and grassland, bushland, and thicket in drier areas. The hillsides have good fertile soil and are heavily populated, largely by farming communities so most of the region has been converted to agriculture with a few areas of natural vegetation remaining. Remaining woodland in the drier areas contains much endemic flora and primarily consists of:

- Podocarpus conifers
- Juniperus procera
- Hagenia abyssinica
- Schefflera heterophylla
- Lobelia gibberroa
- Syzigium guineense
- Juniperus procera
- Olea africana



PROJECT OVERVIEW







DESIGN DEVELOPMENT



AN INDEPTH EXAMINATION OF DESIGN PROCESS

INTRODUCTION

The following case study has been gathered from the United States Agency of International Development- USAID Department. This department has been responsible for the implementation of a new program called Breedlove. Breedlove aims to help Ethiopian women who are living with HIV, through a variety of resources at the Gandhi Hospital in Addis Adaba, Ethiopia. Journeyman International has selected to use this case study as it examines the infrastructure, successes, and challenges of this facility. Through comparison and analysis, Journeyman International has gathered important information which can be applied to our project.

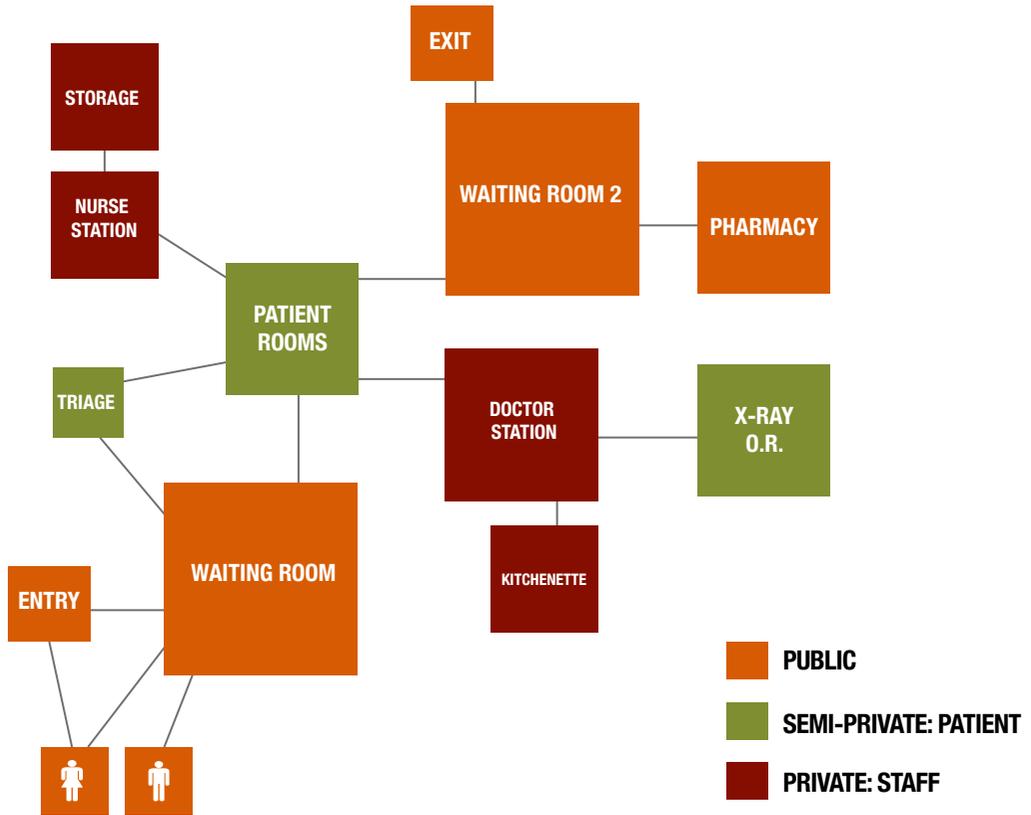
THE BREEDLOVE PROJECT

Food Secure and *HIV-Positive* in Ethiopia began in 2006 as a supplementary feeding intervention supported by a small, one-year grant to PCI from the U.S. Agency for International Development's (USAID) International Food Relief Partnership (IFRP). The women and hospital staff call the project "Breedlove," in reference to the lentil and potato blended soups (manufactured by Breedlove Foods Inc.) that are distributed to project participants. The grant has been re-awarded annually

since 2006: IFRP provides the food and a cash budget to support administrative costs for distributing the soup, but very little for complementary programming.

Working closely with hospital staff, PCI designed the project to complement the PMTCT, ART, nutrition assessment, education, and counseling services that women and children living with HIV receive during hospital and health facility visits. As the project gathered momentum, PCI deliberately linked the soup distributions to its coffee ceremony and agriculture activities to ensure that nutrition supplementation does not stand alone. Thus, this linkage intentionally integrates HIV programming (ART and PMTCT) with FNS programming in a manner that addresses both short-term and long-term needs of these households.

More specifically, the project is comprised of three components: 1) distribution of highly nutritious foods to address short-term nutritional needs; 2) holding coffee ceremony discussions to provide emotional support and education around HIV and FNS; and 3) promoting urban agriculture, including vegetable gardening and poultry raising, to address longer-term nutritional needs. The project's overall aim is to reduce vulnerability



ADJACENCY STUDIES

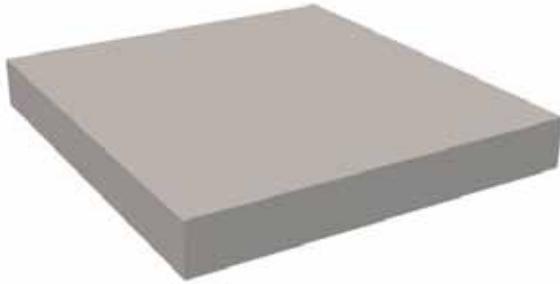
During the design process, a series of adjacency studies were conducted to determine the necessary spatial relationships for the facility. According to the needs of a successful health clinic, it was required that certain spaces have varying degrees of connection throughout.

One example is the waiting room. The waiting room needs direct connection to lavatory facilities, the main entry, and the patient rooms.

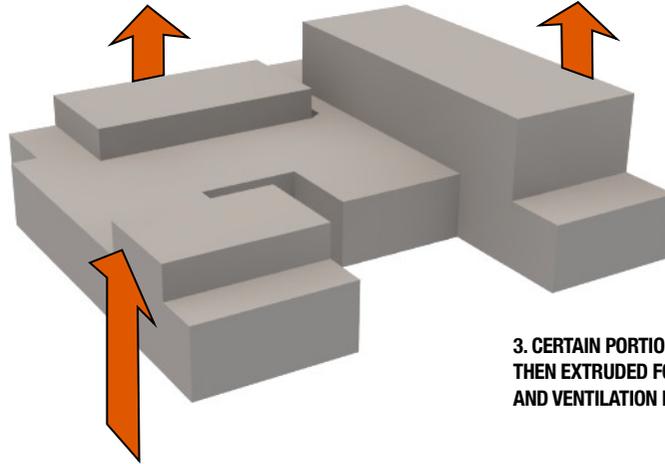
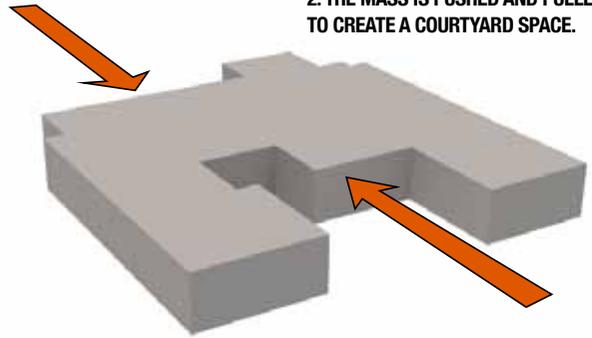
The nurses station requires a visual and physical connection to the patient rooms for security purposes.

The types of spaces are color coordinated to illustrate the degrees of privacy for each space. These types of studies allow the architectural designer to ensure maximum functionality and circulation throughout the facility.

1. A MASS WITH THE ROUGH SQUARE FOOTAGE IS CREATED.



2. THE MASS IS PUSHED AND PULLED TO CREATE A COURTYARD SPACE.



3. CERTAIN PORTIONS OF THE MASS ARE THEN EXTRUDED FOR OCCUPANCY, LIGHTING AND VENTILATION PURPOSES.

MASSING STUDY

After the spatial relationships were established, the next step in the design process allowed for the manipulation of masses. Each space within the program was assigned an exact square footage. The spaces were arranged according to their required adjacencies, and then manipulated vertically to create liveable space.

The concept diagram above illustrates a push and pull method that allowed for the creating of a dynamic building form. Sun and wind patterns informed the direction of the pushing and pulling for each mass.

A U-shaped building was the result of the massing study. This building form proved to be the most efficient way for the spaces to relate and function.





FINAL DESIGN



THE PROPOSED DESIGN FOR THE BAHIR DAR CLINIC PHASE 1





FIRST FLOOR PLAN

After extensive adjacency and environmental studies, the floor plan has developed into a U-shaped building housing two waiting rooms, three patient rooms, two operating rooms, a small pharmacy, and a bunk room for staff.

The relationship between the public and private spaces creates a unique and welcoming experience for the patients, many of which will potentially be intimidated by Western medicine. Extra wide hallways, lined with windows and doors to the exterior provide for proper circulation and natural lighting throughout.

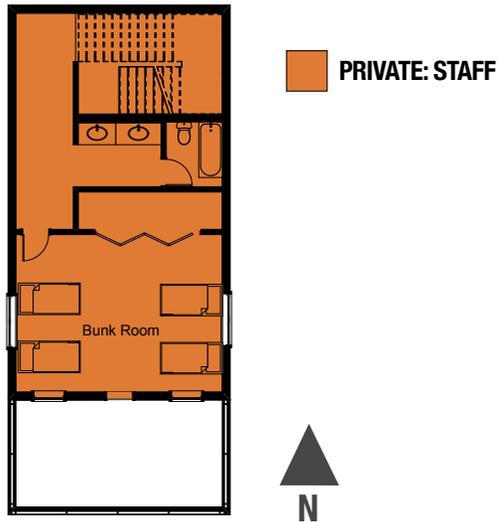
A patient is initially greeted by an ample sized waiting room. This waiting room features vaulted ceilings and a connection to a central courtyard providing for a family oriented clinic. The waiting room and courtyard was designed with the consideration that the men and women would be visiting the hospital with their children in tow.

As patients are called by appointments, they are moved through the first set of doors to the triage. Here a

nurse will greet them and then assign them to one of the three patient rooms. A nurses station at the end of the circulation corridor serves as a watch post for the three patient rooms. Large windows and a second door to the courtyard from the circulation corridor accentuate the clinic's connection with nature.

The facility is complete with a doctor's station, kitchenette, x-ray room, and two operating rooms. The small scale pharmacy, adjacent to the second waiting room, will serve the patients as they make their exit from the clinic after their visit.

The form of the building responds to the wind and sun patterns of the area. Natural ventilation is harnessed through the use of carefully positioned, operable windows that also allow the ambient sunlight to illuminate the various spaces.



SECOND FLOOR PLAN

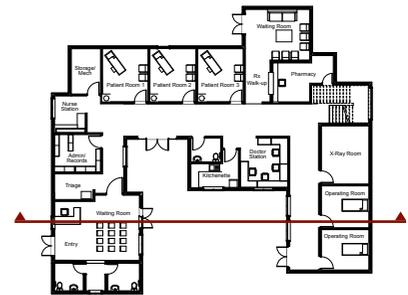
Moving to the most private space, the second floor provides basic living accommodations for up to 8 staff members. An open plan bathroom and ample closet space allows for multiple occupants to function in these spaces at the most basic of levels. A south facing sun deck is accessed off the bunk room. This deck connects the private with the public courtyard and memorial space that it overlooks.



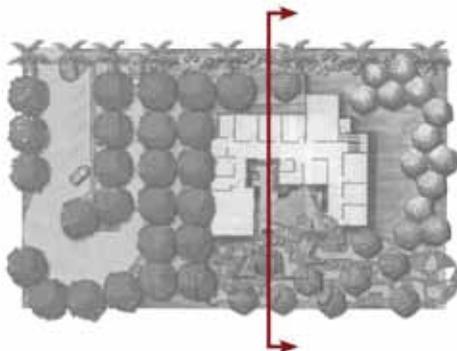


SECTION EAST//WEST

This section cuts through the waiting room, the central courtyard, and one of the operating rooms with the bunk room above. The relationship between the outdoors and interior spaces is maintained on at least three sides of the structure at all times. This important relationship was developed to assure proper natural lighting and ventilation. Keeping the occupants comfortable at all times is also a high priority. Multiple windows and exterior access points helps to remove the “stuffy” and “boxed-in” institutional feel of traditional clinics.



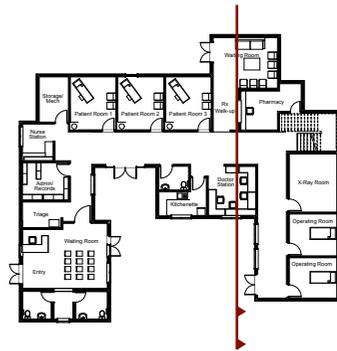
Section North/South

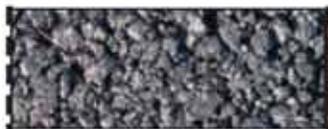




SECTION NORTH//SOUTH

Again, the priority of providing natural lighting and ventilation strategies influenced the thin form of the building. This section cuts through the patient rooms and the circulation corridor. The corridor is lined with windows and a door to the main courtyard space. The form of the building works to deconstruct the layers which typically constitute a hospital. Ultimately, the goal is to provide the Ethiopian people with a facility that is not overtly “Western,” but rather maintains a connection with the holistic, natural world of the exterior.





Parking Lot

Swales capture runoff and plants treat water.



Bike Parking

Biking is most common form of transportation and more sustainable.



Courtyard

Designed waiting space for patients and family members.

Primary Pedestrian Use

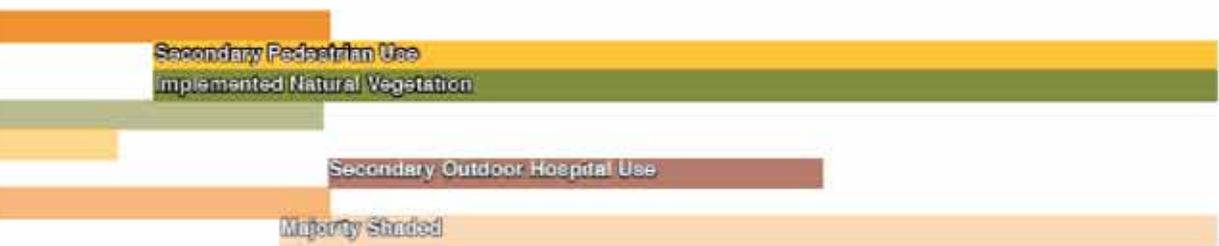
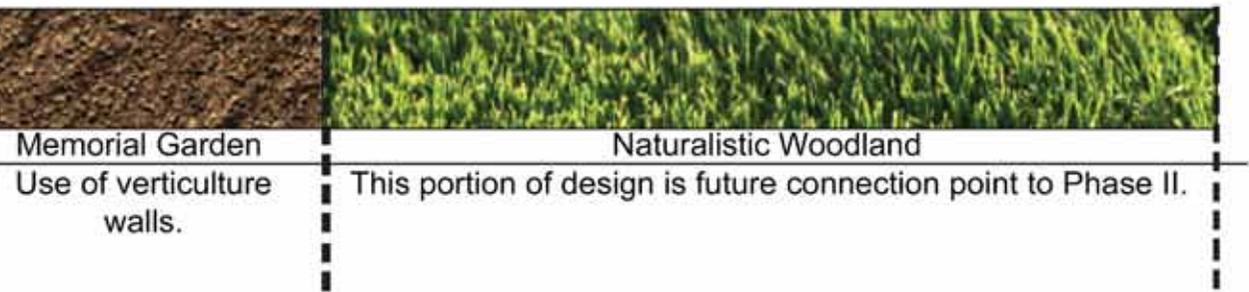
Manicured/Maintained Vegetation

Area of Relaxation

Primary Outdoor Hospital Use

Majority Direct Sunlight

Conceptual Section of Hospital looking N



PLANTS



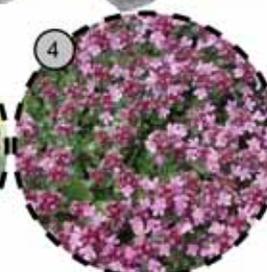
Cordia africana
Wanza
Bark used to splint bone



Euphorbia tirucalli
'Firesticks'
Injil
Young branches chewed
treat sore throats



Aretmisia afra
Ariti
All parts treat cough,
fever, headache



Thymus pseudolanuginosus
Wooly thyme
Oil used as antiseptic



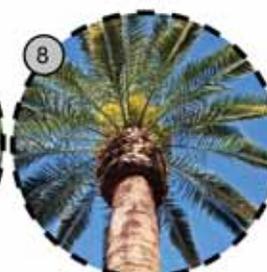
Albizia gummifera
Sesa
Bark decoction
treats malaria
Crushed seeds
treat stomach pains



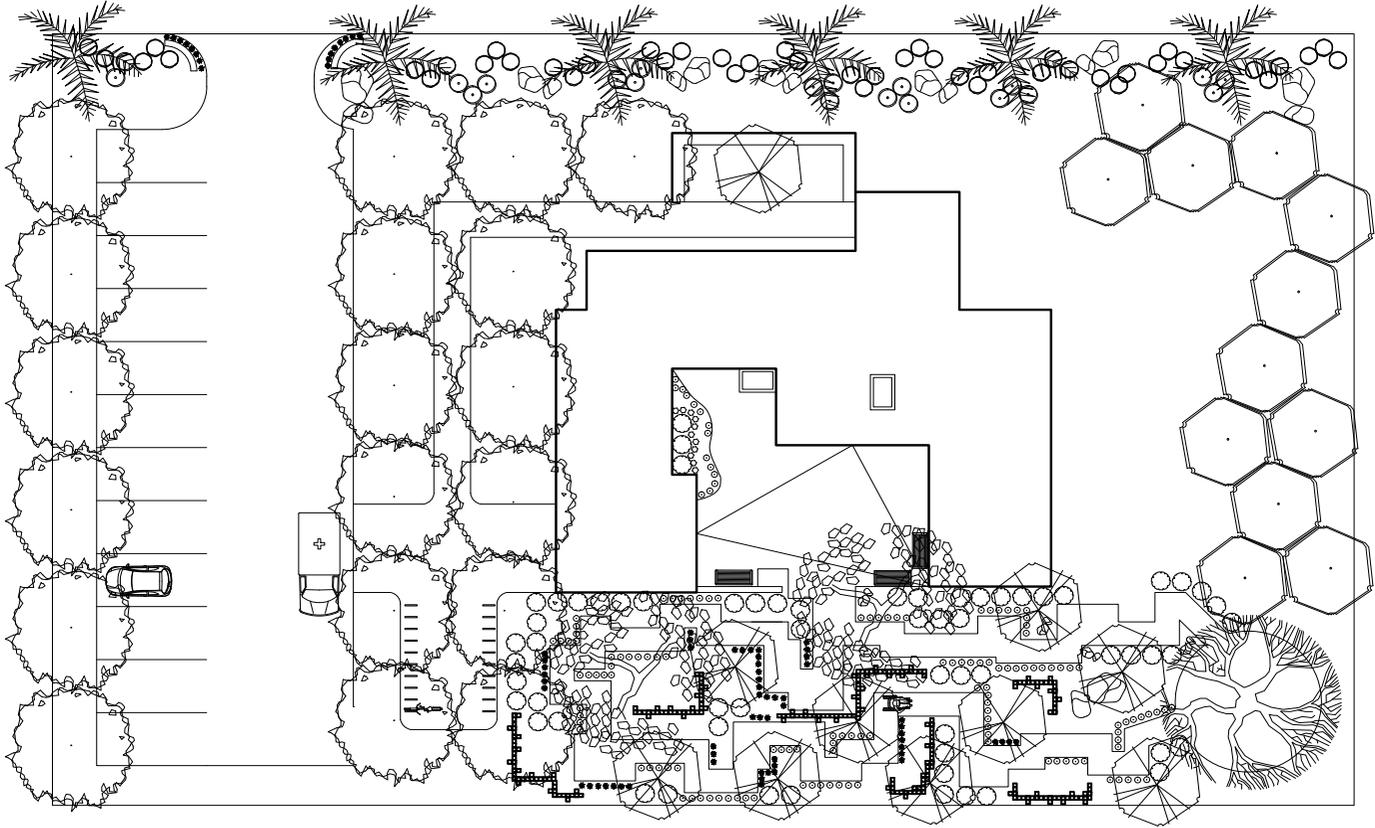
Amaranthus caudatus
Lishalisho
Used as tapeworm
expectorant



Erythrina abyssinica
Kuara
Roots treat syphilis



Phoenix canariensis
Canary Island
Date Palm
Sap makes syrup





More often times than not, the workers in the developing world are skilled in brick and masonry construction.

CONSTRUCTION SCOPE ANALYSIS



A DETAILED LIST OF CONSTRUCTION REQUIREMENTS

The following analysis aims to detail the individual construction scopes that will be required for the Bahir Dar Clinic.

GENERAL REQUIREMENTS

Seed of Health will need to carefully consider all costs and schedule impacts resulting from construction permitting, zoning changes, utility connection fees, and inspection fees.

TEMPORARY FACILITIES AND CONTROLS

This project will require the following temporary facilities and controls:

- Portable toilets
- Scaffolding
- Temporary electrical power
- Temporary or permanent water source during construction
- Temporary interior lighting

TRAFFIC CONTROL

During particular phases of construction, traffic control will be required at the frontage road. We anticipate the need for construction barricades and flaggers during

construction of the stormwater curbs and gutters located at the frontage road, in addition to the drive approaches. Additionally, flaggers will be required during large concrete pours due to the quantity of the concrete trucks.

STORM WATER POLLUTION CONTROL

We will ensure the health and safety of not only the facility, but also its occupants. We suggest the following temporary SWPPP measures:

- Gravel bags and fiber rolls
- Concrete washout area
- Construction entrance
- Dust control

CUTTING AND PATCHING

During construction, Seed of Health may need to trench across city easements or frontage roads. If this is the case, patching will be required to meet Bahir Dar city standards.

SITWORK

The elevations of the site are relatively mild. The site will require clearing and grubbing in preparation for foundation pouring. It is not anticipated that any dirt

export will be required as it can be used at other locations on site.

SURVEYING

The Clinic should plan to have the site surveyed and recorded by a licensed land surveyor prior to breaking ground. The site should be staked for perimeter boundaries, building footprints, underground utilities and other site improvements (site walls, pathways, soccer field, etc.)

PROTECTION OF EXISTING IMPROVEMENTS

It will be important to provide protection for any existing landmarks or vegetation that may be damaged during construction. Further analysis of which plant and tree specimen that will be preserved will be conducted at the site visit.

SELECTIVE DEMOLITION

- Tree removal: Journeyman International should take note of the particular trees and vegetation that will be removed. Tree removal and grinding can be an expensive unforeseen cost.
- Remove select underground utilities: The project team may encounter several unforeseen site conditions (i.e. underground utilities). Be mindful of the potential for such unforeseen conditions, and safety and cost risks involved.
- Site Clearing: After further analysis of the existing plant specimen, Journeyman International will select which plants will be removed for site preparation.

EXCAVATION

Site excavation will have the greatest potential for unforeseen construction costs during the project. This is particularly true with the recently increased price of petroleum. The Journeyman International team strongly encourages a soils testing to develop a clear plan for the extent of site excavation. Important cost aspects to recognize include:

- The price of fuel
- The size and type of machinery
- The travel distance to tow such machinery
- The location and cost for any export/import
- Excavation difficulty (i.e.: rocks, clay)

GRADING

Once general excavation has been completed, the con-

struction team will perform rough grading, pad preparation, and fine grading. This will require the use of several forms of heavy machinery (i.e.: graders, compactors, etc.).

GRAVEL TRENCHES AND BIOSWALES

Seed of Health will need to anticipate the costs involved with excavating and creating bioswales, gravel trenches, sitewall drainage, and general site drainage systems.

BASE (FLATWORK)

In order to ensure long lasting, quality site pathways and curbs, the use of proper compaction and base will be essential. The team needs to make sure that the construction team properly installs all site flatwork.

BASE (PAVING)

The asphalt/concrete base-paving sections should meet general US standards. Journeyman International suggests the use of 10" of engineered base below all asphalt or concrete paving, and below all structural footings and slabs.

BASE (FOUNDATION)

As noted above, Journeyman International suggests a minimum of 10" of engineered base below all structural footings and slabs.

WATER DISTRIBUTION SYSTEM

If the facility intends on bringing city water into the structures, as opposed to using the traditional method of water distribution, the costs of trenching, compaction, backfill, meters, pumps and connections will all need to be considered.

SANITARY SEWER SYSTEM

The first site visit will determine if the facility will be able to connect to the city sanitary sewer system. Otherwise, a detailed plan for an onsite sanitary sewer system will be provided.

STORM DRAINAGE

Journeyman International suggests the implementation of several storm drains of the northern frontage road, in addition to site bioswales and gutters.

GAS DISTRIBUTION SYSTEM

The first site visit will determine if the facility will be

able to connect to city gas distribution systems. If not, a detailed plan for natural gas needs and locations to be engineered will be required.

SITE CONCRETE

Seed of Health will need to anticipate costs for the following items:

- Bollards
- Precast splash blocks
- Curbs and gutters
- Sidewalks
- Driveway apron
- Wheel stops

LANDSCAPE PLANTING

Journeyman International suggests, and has designed a 'xeriscape' landscape architecture plan will utilize native local vegetation that requires no landscape irrigation. Please refer to the landscape architecture plan for full details.

STRUCTURAL CONCRETE

Concrete material and delivery cost will be the greatest cost variable on this project. The Journeyman International construction estimate is based upon a \$100/cy cost of concrete. Structural concrete and reinforcing systems will need to be designed by a licensed structural engineer.

CONCRETE SEALER

All concrete slabs will need to be sealed to prevent water intrusion.

MASONRY

In addition to the structural concrete masonry unit system, masonry retaining walls, trash enclosures and perimeters will be utilized throughout the site.

METALS

Assuming the structural system for the facilities will be concrete, metal fabrications will primarily be used for miscellaneous architectural reasons. Seed of Health will need to consider the following likely applications of metals:

- Stairwell handrails
- Exterior site path handrails
- Awnings
- Flag pole
- Wood framing hardware

- Shower and toilet grab bars
- Stainless backsplashes and counters in food prep areas
- Traffic bollards

SHEET METAL FABRICATIONS

Sheet metal flashing is a crucial element in preventing water intrusion. J.I. strongly encourages Seed of Health to maintain a financial allowance for waterproofing, including sheet metal.

ROUGH CARPENTRY

Demising walls for this clinic can either be constructed out of light gauge steel, concrete masonry units, or wood (rough carpentry).

CASEWORK

Cabinets, casework, and countertops should also be constructed out of composite materials whenever possible. This will provide a healthier environment, and should prevent termite, mice, and general pest infestations. Casework scope will likely include:

- Cabinets
- Countertops
- Bunk beds
- Pantry closets
- Bedroom closets
- Bathroom cabinets and countertops
- Office desks

BUILDING INSULATION

If Seed of Health intends on providing temperature and humidity control to any rooms, the insulated R value should be greater than that of just CMU block. Insulation will reduce sound penetration between occupied spaces.

JOINT SEALANTS

J.I. strongly encourages the use of expansion joints within the CMU walls. This will prevent cracking from soil consolidation and earthquakes.

DOORS AND WINDOWS

Seed of Health should plan on using heavy gauge steel doors on all exit routes, and steel doors and frames in all



facilities.

FINISHES

Interior finishes can quickly overwhelm a project budget. Please be sure to account for labor and material costs associated with all of the following finishes.

- Wall base
- Corner guards
- Painting
- Interior plaster
- Toilet accessories
- Drywall and texture
- Tile
- FRP (Fiberglass Reinforced Plastic)
- Carpet
- Epoxy floor
- Concrete sealers and stains
- Hardwood
- Window coverings
- Door and window trim
- Resilient flooring

SIGNAGE

Seed of Health should consider a financial allowance for the following signage applications:

- Tactile exit signs on all exits
- Tactile exit route signs on all exit routes
- Fire extinguisher signs
- Address signs
- Electrical room sign
- Parking signs

MECHANICAL

This facility will utilize natural ventilation methods, and only incorporate artificial ventilation in particular rooms.

PLUMBING

Once a final construction design has been selected, Journeyman International will assist in the design of the plumbing system.

ELECTRICAL

Seed of Health will need to have a licensed electrical engineer design the electrical system that will be appropriate for these facilities. The following scopes will need to be considered:

- Raceways
- Busways

- Wires, Cables and Conductors
- Boxes
- Cabinets
- Wiring Devices
- Nameplates and Warning Signs
- Panelboards
- Switches, Disconnect and Safety
- Transformers (assumedly pad mounted)
- Underground Electrical Construction and Service
- Grounding
- Distribution Switchboard
- Building Lighting, Interior
- Site Lighting
- Generator System
- Automatic Transfer Switches
- Telephone Utility Service
- Controls and Instrumentation
- Occupancy Sensors



This rural road is being paved with asphalt. Heavy machinery is required for some of these jobs.







EXAMINING THE PROPOSED PLOT OF LAND AND SURROUNDING AREAS

TYPES OF SOIL

There are five different classifications of soil in Ethiopia. The first, and the one that is applicable to our project, is the type of soil located in the Eastern and Western Ethiopian Highlands; this type of soil is composed of eutric nitosols and andosols, and is known as the transitional type of soil from alkaline soil to theolite basalt soil.

These soils are formed from volcanic material and, with proper management, have medium to high potential for rain-fed agriculture. The parcel of land that has been donated to Seed of Health for this hospital is comprised primarily of these two types of soil.

Basalt soil is a common extrusive volcanic rock; and actually one of the most common rock types in the world. It is used in construction to make cobblestones and in making statues. Heating and extruding basalt creates stone wool, which is an excellent thermal insulator. Theolitic basalt is a soil that is relatively rich in silica and poor in sodium. This category of basalt soil is found commonly on the ocean floor, which is interesting to note. When one finds basalt above sea level it usually means that the area is, or once was, part of a volcanically active area. These places are known as hotspot islands, but can also simply be situated along a volcanic arc on thin crust. The shape, texture and structure of basalt is a way to diagnose where and how it erupted – into the sea, or onto land. The significant amounts of reduced iron and manganese that are present in this type of soil provide potential energy sources for bacteria. When basalt is compared to other rock forms found on Earth's surface, basalt weathers relatively fast. When basalt weathers chemically it produces cations such as calcium, sodium and magnesium. These minerals give basalt areas a strong buffer capacity against acidification. Interestingly enough, basalt has been studied as a means of carbon sequestration; as a way to remove carbon dioxide from the atmosphere that has been produced by human

industrialization.

Alkaline soil, the other type of soil found on the site, is a clay soil that has a relatively high pH (considered to be higher than 9). It has a poor soil structure and a low infiltration capacity, which means that drainage on the parcel of land will be strictly monitored and designed. Alkaline soils get their name from the alkali metal group of elements where sodium belongs and that can induce basicity. These soils can also be referred to as sodic soils. Often alkaline soils have a hard calcareous

layer at approximately .5 to 1 meter depth, and they owe their unfavorable physio-chemical properties, mainly, to the presence of sodium carbonate; sodium carbonate is what causes the soil to swell. The presence of the sodium carbonate can be created by man-made irrigation with water that contains a relatively high proportion of sodium bicarbonates, where as naturally the sodium is received as part of natural precipitation. The exact extent of alkaline soils is not precisely known, but what is important to note is that alkaline soils make agricultural production difficult. Because of the low infiltration capacity rainwater tends to stagnate in the soil rapidly, and during the dry season, man-made irrigation is almost entirely impossible. The problems associated with alkalinity however, are more pronounced with clay soils versus sandy or loam soils because in clay soils there is more potential to swell because of a greater specific surface area (the surface area of the soil particles divided by their volume). Alkaline soils can be reclaimed using grass cultures, which ensure the incorporation of very acidifying organic material into the soil as well as the leaching of excess sodium. Additionally deep plowing and incorporating calcareous subsoil into the top soil helps. A common agricultural practice in high alkalinity areas is the use of “tile lines” in the subsurface, which



CONSTRUCTION SAFETY PLAN



AN EXAMINATION OF THE DISEASES, ILLNESSES AND PROBLEMS AFFECTING THE ETHIOPIAN PEOPLE

All safety rules must be obeyed. Failure to do so will result in immediate dismissal from the jobsite.

1. Head protection will be worn on job sites at all times by all trades.

2. Eye protection will be worn when there are potentials of hazards from flying objects or particles, chemicals, arcing, glare, or dust.

3. Protective footwear shall be worn to protect from falling objects, chemicals, or stepping on sharp objects. Athletic or canvas-type shoes shall not be worn.

4. Protective gloves or clothing shall be worn when required to protect against a hazard.

5. Harnesses and lanyards shall be utilized for fall protection.

6. Keep your mind on your work at all times. No horse-play on the job.

7. Precautions are necessary to prevent sunburn and to protect against burns from hot materials.

8. If any part of your body should come in contact with an acid or caustic substance, rush to the nearest water available and flush the affected part. Secure medical aid immediately.

9. The use of illegal drugs or alcohol or being under the influence of the same on the project shall be cause for termination. Inform your supervisor if taking strong prescription drugs that warn against driving or using machinery.

10. Do not distract the attention of fellow workers. Do no engage in any act that would endanger another employee.

11. Sanitation facilities have been or will be provided for your use. Defacing or damaging these facilities is forbidden.

12. A clean job is the start of a safe job.

13. Do not use a compressor to blow dust or dirt from your clothes, hair, or hands.

14. Never work aloft if you are afraid to do so, if you are

subject to dizzy spells, or if you are apt to be nervous or sick.

15. Never move an injured person unless it is absolutely necessary. Further injury may result. Keep the injured as comfortable as possible and utilize job site first-aid equipment until an ambulance arrives.

16. Know where firefighting equipment is located and be trained on how to use it.

17. Lift correctly - with legs, not the back.

18. Nobody but the operator shall be allowed to ride on equipment unless proper seating is provided.

19. Do not use power tools and equipment until you have been properly instructed in the safe work methods and become authorized to use them.

20. Be sure that all guards are in place. Do not remove, displace, damage, or destroy any safety device or safeguard furnished or provided for use on the job, nor interfere with the use thereof.

21. Do not enter an area which has been barricaded.

22. If you must work around power shovels, trucks, and dozers, make sure operators can always see you. Barricades are required for cranes.

23. Never oil, lubricate, or fuel equipment while it is running or in motion.

24. Before servicing, repairing, or adjusting any powered tool or piece of equipment, disconnect it, lock out the source of power, and tag it out.

25. Trenches over five feet deep must be shored or sloped as required.

26. Keep out of trenches or cuts that have not been properly shored or sloped. Excavated or other material shall not be stored nearer than two feet from the edge of the excavation. Excavations less than 5 ft may also require cave in protection in some instances.

27. Use the "four and one" rule when using a ladder. One foot of base for every four feet of height.

28. Portable ladders in use shall be equipped with safety feet unless ladder is tied, blocked or otherwise secured. Step ladders shall not be used as a straight ladder.

29. Ladders must extend three feet above landing on roof for proper use.

30. Defective ladders must be properly tagged and removed from service.

31. Keep ladder bases free of debris, hoses, wires, materials, etc.

32. Build scaffolds according to manufacturers' recommendations.

33. Scaffold planks shall be properly lapped, cleated or otherwise secured.

34. Use only extension cords of the three-prong type. Use ground fault circuit interrupters at all times and when using tools in wet atmosphere (e.g. outdoors) or with any temporary power supply. Check the electrical grounding system daily.

35. The use of harnesses with safety lines when working from unprotected high places is mandatory. Always keep your line as tight as possible.

36. Never throw anything "overboard." Someone passing below may be injured.

Know what emergency procedures have been established for your job site. (location of emergency phone, first aid kit, stretcher location, fire extinguisher locations, evacuation plan, etc.)

I, _____ agree with the above standards that have been set forth by Journeyman International in accordance with General Safety Requirements.

(Signature)

(Date)

REQUIRED FALL PROTECTION SITUATIONS

I. Excavation

A. Excavations greater than 6 feet deep shall be protected from falling using one of the following methods: guardrail systems, fences, or barricades.

B. Where walkways are provided across excavation deeper than 6 feet

C. guardrails will be provided on the walkway.

II. Erection, Leading Edge Work or Unprotected Sides

A. All employees working on a leading edge work (Precast Concrete

B. Erection, Roofing, Steel Erection, etc.) 6 feet or greater above lower levels shall be protected by one of the following: guardrail system, safety net system, or personal fall arrest system. If these systems create a greater risk of harm to employees then the group must meet collectively and come up with a fall protection plan that is feasible. This fall protection plan must be implemented prior to commencement of work.

III. Unprotected Openings

A. Holes are considered a gap or void two inches or more in the least

B. dimension in a floor, roof or walking/working surface.

C. Holes that have a falling distance of less than 6 feet must be covered or clearly marked out with caution tape or a guard rail system to identify the potential fall hazard.

D. Holes that have a falling distance greater than 6 feet above lower levels must be clearly labeled "Hole" or "Cover" and covered with a secured cover rated to withstand without failure at least twice the maximum load of the largest piece of equipment, employees, or materials that may be imposed on that cover at one time.

E. Wall openings such as windows, doors, elevator shafts, stairs, ladders access, material receiving areas and trash chutes with a distance greater than 6 feet above lower levels and the bottom edge of the wall opening is less than 39 inches above the

walking or working surface must be protected from falling by the use of a guardrail system, safety net system or personal fall arrest systems.

F. Ramps, runways and other walkways shall be protected with a guardrail system when the walking surface is greater than 6 feet above the lower level.

IV. Confined Space Entry

No employee shall enter areas defined below without authorization:

A. A space that is not designed for continuous employee occupancy; and

B. Is large enough and so configured that a person can bodily enter into and perform assigned work and Has limited or restricted means for entry or exit; and

C. May have a possible hazardous atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self rescue caused by:

- i. Flammable gas
- ii. Airborne combustible dust
- iii. Atmospheric oxygen concentration below 19.5 or above 23.5%
- iv. A toxic atmosphere or substance
- v. Danger of engulfment

V. General Confined Space Entry Procedure

A. There shall be no unauthorized entry into a confined space by any person.

B. An authorized person shall examine, test and evaluate a potential entry space and determine if it is a "non-permit space" and meets the following requirements:

C. It does not contain any atmospheric hazards or dangers of engulfment capable of causing death or serious physical harm;

D. The space has been proven safe, has been verified, documented, and has a certified guarantee of a safe environment.



VI. The Space:

- A. Contains or has a potential to contain a hazardous atmosphere.
- B. Contains a material that has a potential for engulfing an entrant.
- C. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging wall or by a floor which slopes
- D. downward and tapers to a smaller cross section; or
- E. Contains any other recognized serious safety or health hazard.

BAHIR DAR CLINIC SAFETY MANUAL AND HEALTH POLICY AGREEMENT

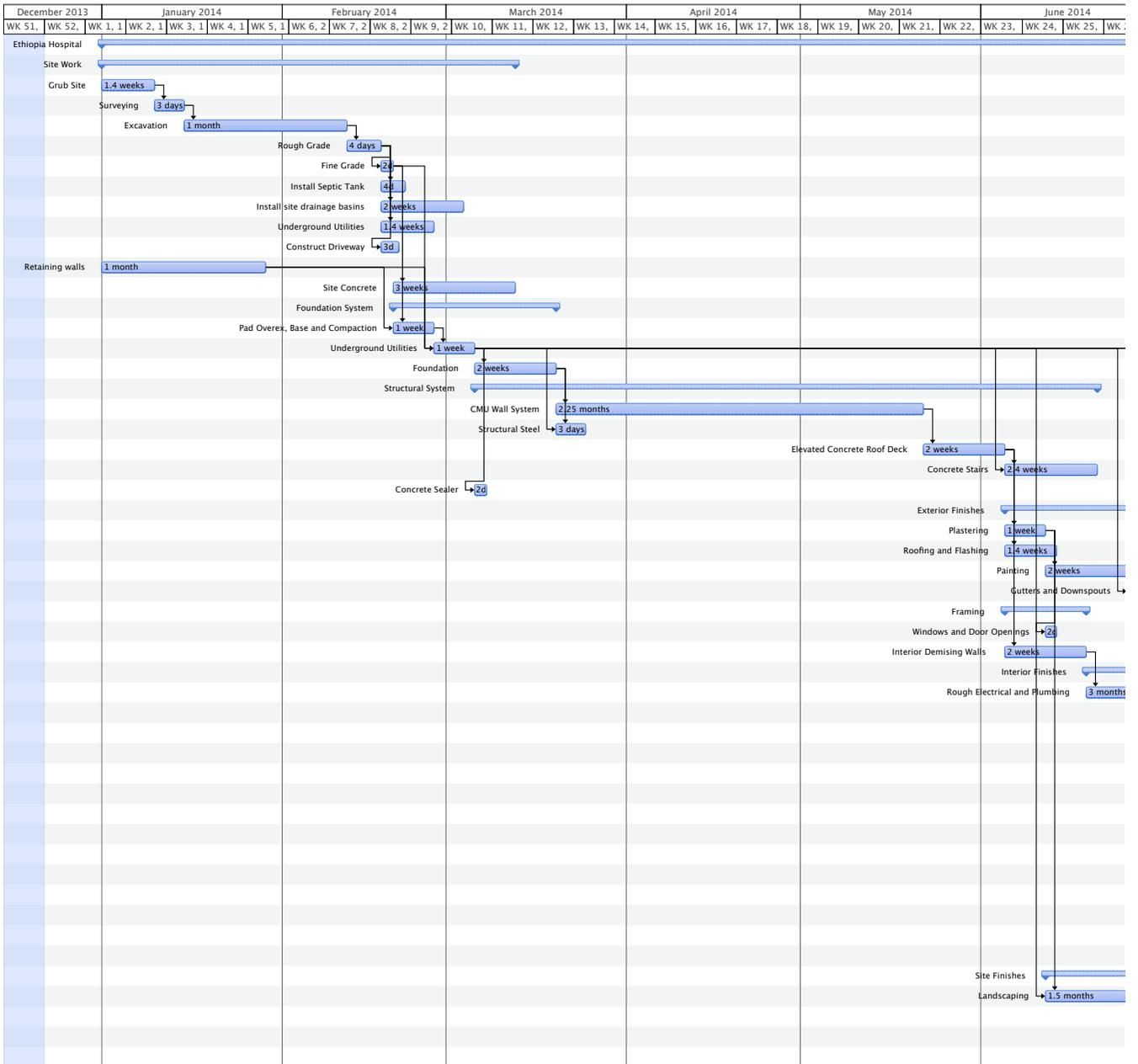
If a job represents a potential safety or health threat, every effort will be made to plan a safe way to do the task. Every procedure must be a safe procedure and follow all guidelines listed herein. Shortcuts in safe procedures by either foremen or workers will not be tolerated. If a worker observes any unprotected job, which may pose a potential threat to their health or safety, he or she must inform management and management must take adequate precautions.

It is the policy of the General Contractor to provide protection and leadership to all employees from unsafe work conditions and practices on the jobsite. Our employees are considered the most fundamental asset of our operations. Their safety must be considered first when planning any construction activity. All employees have the responsibility to work safely and ensure that fellow workers also work safely on the job to ensure everyone leaves the jobsite unharmed at the end of the day. I have read and agree to adhere with all included policies set forth herein accordance to the Seed of Health Safety Manual. I will follow all policies and procedures set forth within this manual to ensure the well being of all job site employees.

(Signature)

(Date)





CONSTRUCTION OUTLINE



#	Info	Title	Given Plan ned Work	Flag Status	# Prede cessors	Expected Start
0	📄	📁 Ethiopia Hospital		🚩		7/1/11
1	📄	Pre-Construction				1/1/13
2	📄	Ground Breaking Ceremony				1/1/13
3	📄	Soils Testing and Report	30 days			1/1/13
4	📄	Construction Documents	20 days			6/5/13
5	📄	Permits / Plan Check	5 days		4	12/26/13
6	📄	Contracts	7 days		4	12/24/13
7		Site Work				1/1/13
8		Grub Site	7 days		4; 6	1/2/14
9		Surveying	3 days		8	1/13/14
10		Excavation	20 days		9	1/16/14
11		Rough Grade	4 days		10	2/13/14
12		Fine Grade	2 days		11	2/19/14
13		Install Septic Tank	4 days		11	2/19/14
14		Install site drainage basins	10 days		11	2/19/14
15		Underground Utilities	7 days		11	2/19/14
16		Construct Driveway	3 days		11	2/19/14
17		Retaining walls	20 days		2	1/1/13
18		Site Concrete	15 days		12	2/21/14
19		Foundation System				2/21/14
20		Pad Overex, Base and Compaction	5 days		12; 17	2/21/14
21		Underground Utilities	5 days		12; 1...	2/28/14
22		Foundation	10 days		21	3/7/14
23		Structural System				3/7/14
24		CMU Wall System	45 days		22	3/21/14
25		Structural Steel	3 days		21; 22	3/21/14
26		Elevated Concrete Roof Deck	10 days		24	5/23/14
27		Concrete Stairs	12 days		21; 26	6/6/14



PROJECT ESTIMATE



Construction Estimate

DESCRIPTION OF WORK	MATERIAL	LABOR	EQUIPMENT	ESTIMATE USD	ESTIMATE Birr
GENERAL CONDITIONS					
Field Supervision	\$ -	\$ 5,000.00	\$ -	\$ 5,000.00	\$ 85,000.00
General Labor	\$ -	\$ 2,500.00	\$ -	\$ 2,500.00	\$ 42,500.00
Permit	\$ 2,500.00	\$ -	\$ -	\$ 2,500.00	\$ 42,500.00
Cost Estimating	\$ -	\$ -	\$ -	\$ -	\$ -
Equipment Fuel	\$ 1,000.00	\$ -	\$ -	\$ 1,000.00	\$ 17,000.00
Plan Reproduction	\$ -	\$ -	\$ -	\$ -	\$ -
Design and Architecture Fees	\$ -	\$ 2,000.00	\$ -	\$ 2,000.00	\$ 34,000.00
Inspection/Testing	\$ -	\$ 500.00	\$ -	\$ 500.00	\$ 8,500.00
Clean-Up	\$ 100.00	\$ -	\$ -	\$ 100.00	\$ 1,700.00
Final Clean-Up	\$ -	\$ -	\$ -	\$ -	\$ -
Small Tools	\$ 1,000.00	\$ 1,000.00	\$ -	\$ 2,000.00	\$ 34,000.00
Misc Gen Condition	\$ -	\$ -	\$ -	\$ -	\$ -
Trailer/Storage	\$ -	\$ -	\$ -	\$ -	\$ -
Temporary Utilities	\$ 500.00	\$ -	\$ -	\$ 500.00	\$ 8,500.00
Bonds	\$ -	\$ -	\$ -	\$ -	\$ -
All Risk Insurance	\$ -	\$ -	\$ -	\$ -	\$ -
Safety/OSHA Permit	\$ -	\$ -	\$ -	\$ -	\$ -
Temporary Fencing	\$ -	\$ -	\$ -	\$ -	\$ -
Project Closeout	\$ -	\$ -	\$ -	\$ -	\$ -
SITE WORK					
Equip Move In/Out	\$ -	\$ -	\$ -	\$ -	\$ -
Traffic Control	\$ -	\$ -	\$ -	\$ -	\$ -
Demolition	\$ -	\$ -	\$ -	\$ -	\$ -
Driven Piles	\$ -	\$ -	\$ -	\$ -	\$ -
Surveying	\$ -	\$ 750.00	\$ -	\$ 750.00	\$ 12,750.00
Construction Water (dust control)	\$ -	\$ -	\$ -	\$ -	\$ -
Dewatering (flood control)	\$ -	\$ -	\$ -	\$ -	\$ -
Shoring	\$ -	\$ -	\$ -	\$ -	\$ -
Rough Grading	\$ -	\$ 1,000.00	\$ -	\$ 1,000.00	\$ 17,000.00
Fine Grading	\$ -	\$ 250.00	\$ -	\$ 250.00	\$ 4,250.00
Excavate road	\$ -	\$ -	\$ -	\$ -	\$ -
Trench/Backfill	\$ 500.00	\$ -	\$ -	\$ 500.00	\$ 8,500.00
Soil Treatment	\$ -	\$ -	\$ -	\$ -	\$ -
Erosion Control (SWPPP)	\$ -	\$ -	\$ -	\$ -	\$ -
Stormwater Drainage	\$ -	\$ -	\$ -	\$ -	\$ -
Sewer connection	\$ 2,000.00	\$ 2,000.00	\$ -	\$ 4,000.00	\$ 68,000.00
Gas connection	\$ 500.00	\$ 1,000.00	\$ -	\$ 1,500.00	\$ 25,500.00
Water connection	\$ 500.00	\$ 500.00	\$ -	\$ 1,000.00	\$ 17,000.00
Elect connection	\$ -	\$ -	\$ -	\$ -	\$ -
Rainwater catchment system	\$ -	\$ -	\$ -	\$ -	\$ -
Base Rock	\$ 1,000.00	\$ 500.00	\$ -	\$ 1,500.00	\$ 25,500.00
Asphalt Concrete Paving (road entry)	\$ -	\$ -	\$ -	\$ -	\$ -
Curb & Gutter (frontage road and drainage)	\$ 500.00	\$ 1,000.00	\$ -	\$ 1,500.00	\$ 25,500.00
Concrete Paving (road)	\$ -	\$ -	\$ -	\$ -	\$ -
Site Concrete (basketball courts, patios, etc.)	\$ 1,000.00	\$ -	\$ -	\$ 1,000.00	\$ 17,000.00
Concrete Unit Pavers	\$ -	\$ -	\$ -	\$ -	\$ -
Site Furnishings (benches, bridges, tables, etc.)	\$ -	\$ -	\$ -	\$ -	\$ -
Perimeter fencing	\$ 2,000.00	\$ 3,000.00	\$ -	\$ 5,000.00	\$ 85,000.00
Landscape/Irrigation	\$ 1,000.00	\$ 1,000.00	\$ -	\$ 2,000.00	\$ 34,000.00
CONCRETE					
Sub Base	\$ 250.00	\$ 500.00	\$ -	\$ 750.00	\$ 12,750.00
Forms & Accessories	\$ 1,000.00	\$ 1,000.00	\$ -	\$ 2,000.00	\$ 34,000.00
Form Liners (for aesthetics)	\$ -	\$ -	\$ -	\$ -	\$ -
Reinforcement (rebar)	\$ 3,000.00	\$ 1,000.00	\$ -	\$ 4,000.00	\$ 68,000.00
Cast-In-Place Conc	\$ 4,000.00	\$ 1,000.00	\$ -	\$ 5,000.00	\$ 85,000.00
Tree Grates	\$ -	\$ -	\$ -	\$ -	\$ -
Caissons	\$ -	\$ -	\$ -	\$ -	\$ -
Curing & Sealers	\$ 200.00	\$ -	\$ -	\$ 200.00	\$ 3,400.00
Precast Concrete	\$ -	\$ -	\$ -	\$ -	\$ -
Floor Toppings (apoxy over concrete floors)	\$ -	\$ -	\$ -	\$ -	\$ -
CMU Grout	\$ 2,500.00	\$ -	\$ -	\$ 2,500.00	\$ 42,500.00
MASONRY					
Concrete masonry units (CMU's)	\$ 5,000.00	\$ 5,000.00	\$ -	\$ 10,000.00	\$ 170,000.00
Brick	\$ -	\$ -	\$ -	\$ -	\$ -

Construction Estimate

DESCRIPTION OF WORK	MATERIAL	LABOR	EQUIPMENT	ESTIMATE USD	ESTIMATE Birr
Stone	\$ -	\$ -	\$ -	\$ -	\$ -
METALS					
Structural Steel	\$ -	\$ -	\$ -	\$ -	\$ -
Metal roof	\$ -	\$ -	\$ -	\$ -	\$ -
Crane & Hoisting	\$ -	\$ -	\$ -	\$ -	\$ -
Misc Metal Fab	\$ -	\$ -	\$ -	\$ -	\$ -
Prefabricated Stairs	\$ -	\$ -	\$ -	\$ -	\$ -
Handrails & Railings	\$ -	\$ -	\$ -	\$ -	\$ -
Gratings	\$ -	\$ -	\$ -	\$ -	\$ -
CARPENTRY					
Rough Carpentry	\$ 2,000.00	\$ 2,000.00	\$ -	\$ 4,000.00	\$ 68,000.00
Glu Lams/Trusses	\$ -	\$ -	\$ -	\$ -	\$ -
Finish Carpentry	\$ 2,000.00	\$ 1,000.00	\$ -	\$ 3,000.00	\$ 51,000.00
Cabinets	\$ 1,000.00	\$ 500.00	\$ -	\$ 1,500.00	\$ 25,500.00
Counter Tops	\$ -	\$ -	\$ -	\$ -	\$ -
Architectural Mill Work	\$ -	\$ -	\$ -	\$ -	\$ -
THERM.&MOIST.PROTECT					
Waterproofing	\$ 500.00	\$ -	\$ -	\$ 500.00	\$ 8,500.00
Water Repellent	\$ -	\$ -	\$ -	\$ -	\$ -
Insulation	\$ 500.00	\$ -	\$ -	\$ 500.00	\$ 8,500.00
Roofing	\$ 500.00	\$ -	\$ -	\$ 500.00	\$ 8,500.00
Roof Accessories	\$ -	\$ -	\$ -	\$ -	\$ -
Metal Siding	\$ -	\$ -	\$ -	\$ -	\$ -
Deck Coatings	\$ -	\$ -	\$ -	\$ -	\$ -
Flashing & Sheet Metal	\$ 500.00	\$ -	\$ -	\$ 500.00	\$ 8,500.00
Downspouts/Gutters	\$ -	\$ -	\$ -	\$ -	\$ -
Joint Sealants/Caulk	\$ -	\$ -	\$ -	\$ -	\$ -
DOORS & WINDOWS					
Doors/Windows/Frames	\$ 5,000.00	\$ 1,000.00	\$ -	\$ 6,000.00	\$ 102,000.00
Access Covers/Panels	\$ -	\$ -	\$ -	\$ -	\$ -
Overhead Door Systems (garage doors)	\$ -	\$ -	\$ -	\$ -	\$ -
Skylights	\$ -	\$ -	\$ -	\$ -	\$ -
FINISHES					
Light Guage Metal Frame	\$ -	\$ -	\$ -	\$ -	\$ -
Lath & Plaster (stucco)	\$ 1,000.00	\$ 3,000.00	\$ -	\$ 4,000.00	\$ 68,000.00
Drywall (green board, x-board, gypsum)	\$ 2,000.00	\$ 2,000.00	\$ -	\$ 4,000.00	\$ 68,000.00
Tile	\$ -	\$ -	\$ -	\$ -	\$ -
Carpet/ hardwood	\$ -	\$ -	\$ -	\$ -	\$ -
Wall Coverings	\$ -	\$ -	\$ -	\$ -	\$ -
Painting	\$ 1,000.00	\$ 250.00	\$ -	\$ 1,250.00	\$ 21,250.00
SPECIALTIES					
Blackboards (classrooms)	\$ -	\$ -	\$ -	\$ -	\$ -
Bulletin/Tack Boards (classrooms)	\$ -	\$ -	\$ -	\$ -	\$ -
School desks and chairs	\$ -	\$ -	\$ -	\$ -	\$ -
Toilet partitions	\$ -	\$ -	\$ -	\$ -	\$ -
Bumper/Corner Guards	\$ -	\$ -	\$ -	\$ -	\$ -
Flagpoles	\$ -	\$ -	\$ -	\$ -	\$ -
Exterior Signage	\$ 500.00	\$ -	\$ -	\$ 500.00	\$ 8,500.00
Interior Signage	\$ -	\$ -	\$ -	\$ -	\$ -
Fire Extinguishers	\$ 250.00	\$ -	\$ -	\$ 250.00	\$ 4,250.00
Fire Extinguisher Cabinets	\$ -	\$ -	\$ -	\$ -	\$ -
Prefab Awnings	\$ -	\$ -	\$ -	\$ -	\$ -
Mail Boxes	\$ -	\$ -	\$ -	\$ -	\$ -
FRP Screen (bathroom walls)	\$ -	\$ -	\$ -	\$ -	\$ -
Metal Shelving	\$ -	\$ -	\$ -	\$ -	\$ -
Wood Shelving	\$ -	\$ -	\$ -	\$ -	\$ -
Toilet Accessories	\$ 500.00	\$ -	\$ -	\$ 500.00	\$ 8,500.00
EQUIPMENT					
Audio Video Screens/TV's	\$ -	\$ -	\$ -	\$ -	\$ -
Lake accessories	\$ -	\$ -	\$ -	\$ -	\$ -
Coax/Antenna/BTS	\$ -	\$ -	\$ -	\$ -	\$ -
Food/Kitchen Service	\$ -	\$ -	\$ -	\$ -	\$ -
Appliances	\$ -	\$ -	\$ -	\$ -	\$ -
Sports Equipment	\$ -	\$ -	\$ -	\$ -	\$ -

Construction Estimate

DESCRIPTION OF WORK	MATERIAL	LABOR	EQUIPMENT	ESTIMATE USD	ESTIMATE Birr
Hood/Vent Systems	\$ -	\$ -	\$ -	\$ -	\$ -
Office Furnishings	\$ -	\$ -	\$ -	\$ -	\$ -
FURNISHINGS					
Window Coverings	\$ -	\$ -	\$ -	\$ -	\$ -
Bunk beds	\$ -	\$ -	\$ -	\$ -	\$ -
Art work	\$ -	\$ -	\$ -	\$ -	\$ -
Office Furniture	\$ -	\$ -	\$ -	\$ -	\$ -
SPECIAL CONSTRUCTION					
Fire/Security System	\$ -	\$ -	\$ -	\$ -	\$ -
CONVEYING SYSTEMS					
Scaffolding	\$ -	\$ -	\$ -	\$ -	\$ -
MECHANICAL WORK					
Fire Protection sprinklers	\$ -	\$ -	\$ -	\$ -	\$ -
Plumbing	\$ 5,000.00	\$ 2,000.00	\$ -	\$ 7,000.00	\$ 119,000.00
Cable/Coax Cover	\$ -	\$ -	\$ -	\$ -	\$ -
HVAC (each house)	\$ -	\$ -	\$ -	\$ -	\$ -
Air Test & Balance	\$ -	\$ -	\$ -	\$ -	\$ -
ELECTRICAL					
Electrical	\$ 8,000.00	\$ 2,000.00	\$ -	\$ 10,000.00	\$ 170,000.00
Telecom	\$ -	\$ -	\$ -	\$ -	\$ -
Generators	\$ -	\$ -	\$ -	\$ -	\$ -
Lighting	\$ -	\$ -	\$ -	\$ -	\$ -
Data & Communication	\$ -	\$ -	\$ -	\$ -	\$ -
Audio/Video/CCTV	\$ -	\$ -	\$ -	\$ -	\$ -
Fire Alarm	\$ -	\$ -	\$ -	\$ -	\$ -
			\$ -		\$ -
TOTAL	\$60,300.00	\$ 39,250.00	\$ -	\$ 104,550.00	\$ 1,777,350.00