



West African Health Foundation Specialty Hospital

A New Vision for Health in West Africa

WEST AFRICAN HEALTH FOUNDATION SPECIALTY HOSPITAL: A NEW VISION FOR HEALTH IN WEST AFRICA
produced by

COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK
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Urban Design Program, Graduate School of Architecture, Planning and Preservation (GSAPP)

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PREFACE



Photograph taken of the WAHF Specialty Hospital site near Juaben.

The Urban Design Lab (UDL) is pleased to release this report on the design options for a new regional hospital at Juaben, Ghana. By analyzing regions, cities and sites through the perspective of urban designers, we take advantage of those traditional architectural methodologies that address site specificity, physical form, economic constraints and construction logistics, among other considerations. In addition, we must engage ecology and health, among multiple urban systems at many scales. Urban Design also advocates for an interaction in “top-down” and “bottom-up” processes to accomplish projects within this complexity. In an age when cities are rapidly urbanizing, new forms and meanings are needed to design for more equitable futures.

In the final global studios within the post-graduate Urban Design Program at Columbia University’s Graduate School of Architecture, Planning and Preservation (GSAPP), student teams and faculty develop comprehensive projects incorporating the complexity of issues and multiplicity of stakeholders involved in an urban intervention. In the Spring Semester of 2013, the Urban Design Program, in collaboration with the Earth Institute’s Millennium City Initiative (MCI), was engaged in several projects in the metropolitan region surrounding Kumasi, Ghana. As a growing city of approximately two million inhabitants, both physical and social infrastructures are under extreme pressure for development.

In collaboration with our team, the West African Health Foundation (WAHF) participated with the studio as an informational resource, a critical eye and ultimately as a client. Tasked by the Foundation to design a hospital for a rural site in Juaben, 30 minutes outside of Kumasi, the studio developed the following proposal. Considering what role this new specialty hospital can play in the local, regional and international health system, the team developed a series of arguments that are outlined in this publication. Hopefully, this document will not only exist as a record of the collaboration of the urban design team and WAHF, but also as a verification of how this hospital can transform a region.

The Urban Design Lab at Columbia’s Earth Institute has played an important role in defining the studio’s emphasis and in synthesizing the studio’s work into the format of this publication. We hope that the WAHF hospital project will receive the broad interest that it fully deserves and that this important initiative will come to fruition.

Authored by Richard Plunz

*Director, Urban Design Program at the Graduate School of Architecture, Planning and Preservation, Columbia University
Director, Urban Design Lab at the Earth Institute, Columbia University*

INTRODUCTION



Photograph taken of the WAHF Specialty Hospital site near Juaben.

The West African Health Foundation (WAHF) is a non-profit, non-governmental organization formed in New York on February 17, 2001 by a group of physicians who were concerned with the poor health and nutritional status of the people, particularly children and women of the West African sub-region.

WAHF recognizes that the major causes of mortality and morbidity in this sub-region could be prevented or reduced substantially through effective health and nutritional education at a fraction of the cost currently expended by the governments and individuals in managing these problems.

Over the past two to three decades, the idea that preventive and primary level care are more successful and cost-effective on a population-wide basis has gained currency and general acceptance especially in the economically distressed countries of Sub-Saharan Africa. Governments in these countries have discovered that hospitals constitute a financial burden and drain on their fragile economies absorbing 40 to 60 per cent of the recurrent expenditure on health services. Despite all these financial sacrifices, the hospitals in these countries have had limited, and in some cases, negative impacts on the health of the population. In Ghana, the press has dubbed hospitals as "killing fields." The reasons for the perilous state of the hospitals are protean. Staff is under-paid, under-employed and demoralized; buildings and equipment are decrepit, while services are poor and graft is rampant.

OUR MISSION

We aim to promote health through wellness education and disease prevention through the unrestricted, comprehensive medical and public health outreach interventions and educational programs that cover the following:

1. Health and Wellness Education

The primary focus of the Foundation over the past 10 years has been health and wellness education. A pilot comprehensive public health and preventive medicine program has been established at Juaben in the Ashanti region of Ghana. This program aims to teach individuals in the community to take charge of their own health by preventing some diseases or illnesses before they occur. The health issues currently taught and the topics that will be covered at these instructive seminars in the near future include:

- a. Maternal/reproductive and child health
- b. Infectious diseases (Malaria, HIV/AIDS, Tuberculosis, Hepatitis)
- c. Sexually transmitted diseases
- d. Sanitation/ environmental health, personal hygiene
- e. Injury prevention
- f. Tobacco/ alcohol/ substance abuse
- g. Immunization
- h. Nutrition
- i. Potable water

2. Medical Missions

Teams of physicians and other allied professionals have traveled to Ghana on medical missions annually to render much needed medical care. During this period the Foundation's volunteers have rendered outpatient and inpatient care including surgical operations at a rural hospital and conducted community-wide breast cancer and hypertension screening. This has been done in collaboration with the local health care providers.

3. Medical Equipment & Surgical Supplies Donation

The Foundation has donated medications, surgical supplies, medical equipment and computers to several health institutions in Ghana since 2002. Two hemodialysis machines, fetal monitors and cardiac monitors were donated to tertiary medical institutions in Ghana in the summer of 2006.

4. Malaria Control Program

The Foundation became acutely aware of the burden of malaria on pregnant women and children below the age of five years whilst its volunteers were working in health facilities in rural communities in Ghana. The Foundation launched a phased pilot Malaria Control Program at Juaben. The town of Juaben is surrounded by about 13 satellite villages and has a total population of 156,000. The Foundation's approach to the control of the scourge of malaria is innovative, sustainable and comprehensive. It involves the following:

- a. WAHF works with the affected communities to raise awareness of malaria prevention methods and seek their active participation in this effort. The Foundation elicits support from the village or community chief and elders, traditional and municipal councils, the youth groups, school teachers, churches and mosques. The Foundation also collaborates with the community hospital, its physician(s) and community/public health nurses to carry out its mission.
- b. The Foundation provides the community with the wherewithal to control the breeding grounds of the insect vector, mosquito, whose bite transmits the protozoa that causes malaria. Tools and implements such as Wellington boots, wheelbarrows, rakes, brooms, brushes, and shovels are donated to the community. The donated items are utilized by the community to de-silt clogged drains/gutters, drain stagnant pools of water, remove/drain empty containers, fill pot-holes and improve general environmental sanitation.
- c. The communities are provided with life saving information on how to recognize the early symptoms and signs of malaria and access effective treatment of this dreadful disease when contracted.
- d. The communities are provided with free Long Lasting Insecticide Treated bed-Nets (LLITNS). This free distribution of LLITNS is usually piggybacked on other community wide health programs, such as baby clinics, community immunization or mass de-worming or dental check-ups. The Foundation has distributed 8,000 Long Lasting Insecticide Treated bed-Nets (LLITNS) to date.
- e. The Foundation provides Government of Ghana approved chemicals to the communities for targeted environmental spraying and Indoor Residual Spraying (IRS).
- f. The next phase of the Foundation's Malaria Control Program will be introduction of home based care for the treatment of uncomplicated Malaria for children under 5 years of age together with Intermittent Preventive Treatment during pregnancy (IPTp).



In our effort to sustain a community based implementation plan, the Foundation has built a partnership with community leaders, youth groups and health providers. WAHF plans to sustain, monitor and evaluate key and important components of its program in the coming years collaborating with the established community infrastructure. In the event that an acute or chronic illness occurs, it is the Foundation's hope that a specialty hospital is available to manage the problem competently expeditiously and with compassion.

OUR VISION

It is the vision of WAHF to establish a specialty hospital at Juaben. This will be a 250 bed "green" facility with high-tech infrastructure and state-of-the-art equipment that will be patient-centered and provide compassionate care in a serene and invigorating environment. This vision is in consonance with the Government of Ghana and Ministry of Health's key policy directive of focusing on development led by the private sector through increased emphasis on the use of non government and private health providers.

The long term goal of WAHF is a commitment to make world-class, quality healthcare affordable to the people of Ghana and the West African sub-region. The Foundation also aims to improve the human condition at the center of academic culture devoted to excellence in health education, patient care, basic science, clinical and medicinal plant research.

It is anticipated that in the near future a wave of retiree physician/dental specialists in Europe, North America, Africa and other parts of the world shall be returning to the sub-region. This human capital could hopefully be prevailed upon, recruited or could volunteer to give a helping hand in patient care and teaching. The younger specialists not ready to relocate could take working/ vacation assignments at the proposed specialty hospital.

The WAHF Specialty Hospital shall provide:

1. Post-graduate training and capacity building for healthcare providers of Ghana and the sub-region
2. Information-Communication Technology (ICT) and Distance Learning Center
3. A dedicated facility to conduct workshops, forums, conferences and other educational programs in collaboration with existing local (i.e. Komfo Anokye Teaching Hospital and KNUST), regional and international educational and healthcare institutions
4. Participation in research in basic science, epidemiology, medicinal plants, food/nutrition and clinical studies through its research center
5. An International Volunteer Network, actively seeking affiliation with international healthcare institutions, agencies and health professionals

This facility will serve also as a referral center for the various clinics, hospitals in the Ashanti Region, the rest of Ghana and the West African sub-region.

HEALTH POLICY FRAMEWORK

The government has announced the following strategies to improve the healthcare sector:

1. Empowering households and communities to take more responsibility for their health
2. Improving the financing of healthcare by ensuring the efficient and effective use of all available resources from government, non-governmental organizations and private, mission and donor sources
3. Promoting intersectoral action for health development, particularly in the areas of food and nutrition, employment, education, water and sanitation
4. Re-prioritizing health services to ensure that primary health care services (i.e. services with maximum benefits in terms of morbidity and mortality reduction) receive more emphasis in resource allocation
5. Strengthening and decentralizing management within the context of a national health service
6. Forging linkages between private and public providers of healthcare to ensure consensus and that all resources are focused on a common strategy
7. Expanding and rehabilitating health infrastructure to increase coverage and improve quality
8. Strengthening human resource planning, management and training as a means of providing and retaining adequate numbers of good quality and well-motivated health teams to provide the services
9. Providing and managing adequate logistics such as drugs and other consumables, equipment and vehicles at all levels of the health system
10. Strengthening the monitoring and regulatory systems within the health service to ensure more effective implementation of programs

Key policies include:

1. An emphasis on community-based care, focusing on posting nurses to communities
2. A focus on development led by the private sector through increased emphasis on the use of non-government and private health providers

HEALTHCARE AGENCIES

Two agencies, the Ministry of Health (MOH) and Ghana Health Scheme (GHS) manage the health sector. The MOH is the office responsible for budget allocation and policy definition, while GHS, with branch offices at both the regional and district levels, is mainly responsible for the implementation of the budget and policies. In addition, non-government entities are also very active in the health sector.



HEALTH SERVICES RENDERED AT WAHF MISSION

NATIONAL HEALTHCARE INSURANCE SCHEME (NHIS)

In 2004, the Ghanaian government established a National Health Insurance Scheme (NHIS) program as part of its national goal to offer equitable access to basic healthcare. The NHIS enables residents in Ghana to obtain basic healthcare services without paying at the point of delivery of the service and is intended to replace the cash-and-carry system currently in place. NHIS maintains a 200 million USD endowment, which is equivalent to 100 USD per person. The endowment is financed through a 2.5 percent NHIS levy on GDP. This is a diversion of 2.5 percent of Social Security contributions and funding from the Heavily Indebted Poor Countries (HIPC) debt relief program. NHIS operates at an expense to the government of 10-17 million USD per year, and NHIS provides insurance coverage for 94 percent of general diseases. In-patient physiotherapy and road accidents are covered for orthopedic care, but specialized orthopedics remains out of scope for NHIS at present.

NHIS is in its nascent stages and is operational at the basic levels throughout the country. Given the historical lack of effectiveness of government tax-collecting, long-term sustainability of the system is not assured. However, NHIS represents an important milestone in expansion of access to needy Ghanaians and is the realization of an important piece of the government's healthcare agenda.

INSURANCE AND COVERAGE

With a health expenditure (NHIS budget) of 10-17 million USD annually, part of which is subsidized by international donor initiatives, the main aim of the scheme is to provide basic health care for the country's poor. Being a new scheme with limited funds, it focuses on communicable diseases. An estimated 20 to 50 percent of in-patient admissions and up to 50 percent of out-patient visits are cases of malaria.

According to the scheme, Ghanaians are supposed to "pay an annual fee according to their income—keeping in mind the minimum wage is about 1.5 USD per day. Impoverished people contribute about 10 USD annually, whereas workers in the formal sector pay 2.5 percent of their social security contribution. The government covers the aged, indigent and children whose parents pay into the scheme. Financing comes through a 2.5 percent National Health Insurance levy on selected goods and services. It is also funded by the Highly Indebted Poor Countries Initiative.

Three types of insurance schemes exist under the National Health Insurance Scheme:

1. District-Wide (Public) Mutual Health Insurance scheme through which the workers of the public sector directly pay a share of their wages into the health insurance system
2. Private Mutual Health Insurance scheme through which subsistent farmers, people working in the informal sector and unemployed people who were not formerly employed in the public sector are to pay their contribution
3. Private Commercial Health Insurance Scheme through which those employed by larger companies and multi-national companies pay their contributions



Within these schemes, the health insurance program offers the following benefits package:

1. Full out-patient department (OPD), admission and treatment (surgery and medical) cost including feeding are catered for if listed on the scheme
2. Full payment for medicine if within the approved list
3. Payments for referrals (gatekeeper system) are taken care of provided it is within inclusive list

The exclusion list of stipulations, i.e. treatment not covered by the scheme, entails:

1. Appliance, prostheses, rehabilitation, dentures, organs aids, cosmetics surgery and assisted reproduction
2. HIV retro-viral drugs, hormone and organ replacement therapy
3. Heart and brain surgery other than accidents
4. Diagnosis and treatment abroad
5. Dialysis for chronic renal failure and cancers

A total of 41 percent of the targeted people were covered under the scheme by May of 2007. In a parliamentary assessment of the scheme at the end of 2007, the health minister stated that the total number of people registered under the NHIS had increased from 8.6 million to 9.6 million, representing approximately 47 percent of the country's total population. (Ghana Parliament, 18 December 2007) Coverage varied between 19-65 percent, depending on the region.

OUT-OF-POCKET PAYMENTS

In 2005, the percentage of expenditures paid out-of-pocket in Ghana amounted to 79.1 percent of the total private expenditure on health, which forms 65.9 percent of the country's total expenditure on health. (WHO, May 2008) As can be deducted from these figures, out-of-pocket payments make up approximately 50 percent of the combined public and private expenditures on health.

The Health system of Ghana is still in a transitory process—it is being transformed from the former "cash-and-carry" to the newly implemented insurance system. The previous system was one based on a full-cost recovery on a pay-for-access basis. The aim of charging access fees was to recover 15 percent of the public sector operation cost. Though this aim was achieved, there were always difficulties as costs of illnesses vary and the majority of the people could not afford treatment. Financial access and equity for low-income people was always a problem. Though some exceptions were introduced, increasing public discontent called for its abolishment.

Authored by the West African Health Foundation

GHANA AND WAHF



Photograph taken of the WAHF Specialty Hospital site near Juaben.

DEFINING THE GHANAIAN HEALTHCARE SYSTEM IN THE NEXT 50 YEARS

The health of a nation is dependent on several intertwining factors including the state of the economy, the number of people in gainful employment, the educational level and the poverty rate of its nationals. A projection in the next 50 years of the state of the Ghanaian Health System will be dependent on all of the above factors, both independently and in combination.

The Ghanaian Health System is presently structured of complex hierarchical layers of care, including basic health posts at the village level, community health centers, district hospitals, regional hospitals and two teaching hospitals at the top of the pyramid. Currently, the government is the largest provider of health care in Ghana, followed by the mission/faith based organizations and then the private practitioners.

DEMOGRAPHICS AND HEALTH STATISTICS

The population of Ghana is 24,250,000 (2010 census) with a current population growth rate of 1.9 percent. The historical growth of the population of Ghana trends exponentially. Ghana's first post-independence population census in 1961 revealed that there were 6.7 million inhabitants. By 1970 the national population size had increased to 8.5 million, approximately a 27 percent increase. If the current annual population growth rate of 1.9 percent is sustained, the population of Ghana is projected to increase to double the current figure of over 24 million in the next 50 years. This will have a major impact on Ghanaian health, education, housing, infrastructure, utilities, sanitation and economy.

Forty-four percent of the population is below the age of 15 while only 5 percent is above the age of 65. Life expectancy at birth for a Ghanaian increased from an estimated 58 years for both sexes in 1990 to 63.5 in 2010—62 years for males and 65 years for females. Infant mortality was 76 per 1000 live births in 1990 and improved to 47 per 1000 in 2009, and the

under-five mortality rate was 120 per 1000 live births in 1990 and improved to 69 per 1000 in 2009. (WHO Ghana Factsheets of Health Statistics, 2010) Although overall health is increasing, a rapidly urbanizing population—36 percent in 1990 to 50 percent in 2008—means that public hospitals alone cannot keep up with the demand.

DISEASE PROFILE

Ghana like most developing countries is predominantly afflicted with communicable diseases that can be prevented and controlled by improvements in the socio-economic standards of the people. Improvements in the educational level of the general population, particularly of women, along with improvement of drinking water, sanitation, hygiene, nutrition and the development of national health systems are some of the most cost-effective measures that governments can take in protecting the health of their citizens.



The most common diseases in Ghana include those endemic to Sub-Saharan African countries: malaria, pulmonary tuberculosis, measles, cholera, infectious hepatitis, typhoid fever, anthrax, pertussis, tetanus, yellow fever, schistosomiasis, trachoma, dysentery, diarrhea diseases with dehydration, dracunculiasis, onchocerciasis, pneumonia, venereal diseases and HIV/AIDS. However, some discernible improvements have been made in the health of the nation over the last 50 years, as evidenced by the improvements in some of the health indicators like the infant mortality rates, the under-five mortality rates and the life expectancy at birth rates.

Epidemiological transition associated with development is characterized by a shift in communicable diseases and nutritional deficiencies to chronic diseases (non-communicable diseases). A typical example is a transformation from infectious diseases to degenerative and chronic diseases due to diet, sedentary lifestyle, lack of medical access, smoking leading to cardiovascular diseases, cancer, diabetes and chronic lung diseases. Six of the leading risk factors—underweight childhood, unsafe sex, alcohol use, unsafe water, sanitation and high blood pressure—are responsible for a quarter of all deaths in the world and one fifth of all Disability Adjusted Life Year (DALYs). Reducing exposure to these risk factors would increase global life expectancy by nearly 5 years (WHO).

Alcohol use, tobacco use, high blood pressure, high body mass index, high cholesterol, high glucose, low fruit/vegetable intake and physical inactivity combined account for over 61 percent of all cardiovascular deaths. Together, these same risk factors account for over three quarters of ischemic heart disease, the leading cause of death world-wide. Understanding the role of these risk factors will be hugely important for the Government of Ghana to develop clear and effective measures for improving the health of the nation in the near future.

An additional trend that has been noted is the gradual aging of the population. This also means that non-communicable diseases commonly associated with aging, such as dementia, Alzheimer's, various cancers, heart disease, stroke, heart attacks and diabetes will increasingly become a significant part of the health profile of the country. In the next 50 years Ghana is going to have to grapple with the double burden of increasing chronic, non-communicable conditions, as well as the inevitable communicable diseases that traditionally affect the poor.

It is also anticipated that most of Ghana's population growth will occur in the urban areas. The rapid, unplanned and unsustainable styles of urban growth are making developing cities the focal points of emerging environmental and health hazards. These hazards include the synergistic problems of urban poverty, traffic fatalities and air pollution. Increased suburbanization, motorization and diminishing space for recreation and walking is associated with physical inactivity, which inexorably leads to a surge in non-communicable diseases.

HOSPITALS AND HEALTH SYSTEMS OF THE FUTURE

The hospitals and healthcare related infrastructure of the future will be increasingly managing non-communicable diseases and chronic diseases induced by an aging population and changing lifestyles. These diseases are already common in industrialized nations and will have ominous implications for a country like Ghana, which will additionally continue to battle diseases caused by traditional problems of poverty, such as under-nutrition, unsafe water, environmental pollution, infectious diseases and parasitic infestations. Therefore, demands on the health systems will increase, but resources for health will remain scarce. In order to protect the citizens, and help them protect themselves, the government will need to assess the risk and choose the most affordable interventions, which will include vigorous health education campaigns. Investing heavily in communications technology will be a crucial role of the government for better education and dissemination of information within the healthcare provider community and the population at large. Telemedicine and distance learning will have to become important media for reaching healthcare providers in rural communities—for patient care and continuing education purposes.

Almost all important health problems and major causes of premature death such as cardiovascular disease and cancer are more common among people with lower levels of education, income and occupational status.



WOMEN GATHER AT WAHF HEALTH MISSION

Narrowing the health gap within Ghana, especially between the Northern and Southern regions, is essential if the government is to create a country of social justice as well as prosperity.

The emerging importance of non-communicable diseases and aging population will call for specialized regional public and private medical centers that cater to patients. These would be dedicated regional cardio-thoracic, orthopedic, neurology/neuro-surgery, renal, cancer/oncology, physical medicine/rehabilitation, trauma/burn and mental health treatments. In addition, geriatric nursing centers will be needed establishments to manage these specific kinds of patients.

The West African Health Foundation Specialty Hospital, as envisaged, could play a pivotal role in the overall healthcare provision in Ghana for the coming years. Other hospitals, like the Hadassah Foundation Hospitals in Israel, Dr. Devi Shetty's flagship Narayana Hospitals in Bangalore and The Apollo Hospital System in India, were established by committed individuals and groups with the sole purpose of improving the healthcare services in those countries. These organizations have established clinics in rural areas and first rate hospitals in urban areas. WAHF will adapt and model its Specialty Hospital after these unique institutions as well as seek possible affiliations with them.

"My first objective is to abolish from Ghana poverty, ignorance and disease. We shall measure our progress by the improvement in the health of our people; by the number of children in schools and the quality of their education; by the availability of water and electricity in our towns and villages and by the happiness which our people take in managing their own affairs. The welfare of our people is our chief pride and it is by this that my government will ask to be judged."

Dr. Kwame Nkrumah, December 1957
(The first President of Ghana)

Authored by the West African Health Foundation

COLLABORATION



Photograph taken of the WAHF Specialty Hospital site near Juaben.



VISIT TO JUABEN

The faculty and students from the Urban Design program of Columbia University's Graduate School of Architecture, Planning and Preservation visited the town of Juaben with officials from the Kumasi Metropolitan Assembly as well as health related personnel from Millennium Cities Initiative as part of the students' on-site study in Kumasi in February of 2013.



VISIT TO HOSPITAL SITE

The visit to the site where the WAHF Specialty Hospital is envisioned was organized by officials from the palace of Juaben under directions from the Chief of Juaben Nana Otoo Siriboe II. The present site has a fairly large existing grove of orange trees along with an abundance of green cover throughout the plot.



PRESENTATION AT KUMASI MUNICIPAL ASSEMBLY (KMA)

The 10 day field trip to Kumasi culminated in a series of presentations that were made by students of KNUST and GSAPP together at the Kumasi Municipal Assembly to the Commissioner of the Planning Department and other officials and interested parties. The presentations raised questions and issues which were discussed and responded to by the people present.



DESIGN MEETINGS WITH WAHF DOCTORS

The evolution of the design for the Specialty Hospital has been a strong collaboration between the members of WAHF and the student design team at Columbia University. Throughout the course of the spring semester of 2013, the team dealt with broad issues of health in Kumasi and focused on translating these ideas into the design of the hospital itself.



END OF YEAR SHOW AT GSAPP

The spring semester of the Urban Design Program at GSAPP culminated in an exhibition that featured a collection of studio projects including the WAHF hospital project, entitled "Growing Canopies." The exhibition was open to the public and attended by experts and professionals in the fields of architecture, planning and urban design.

HOLISTIC HEALTH IN KUMASI



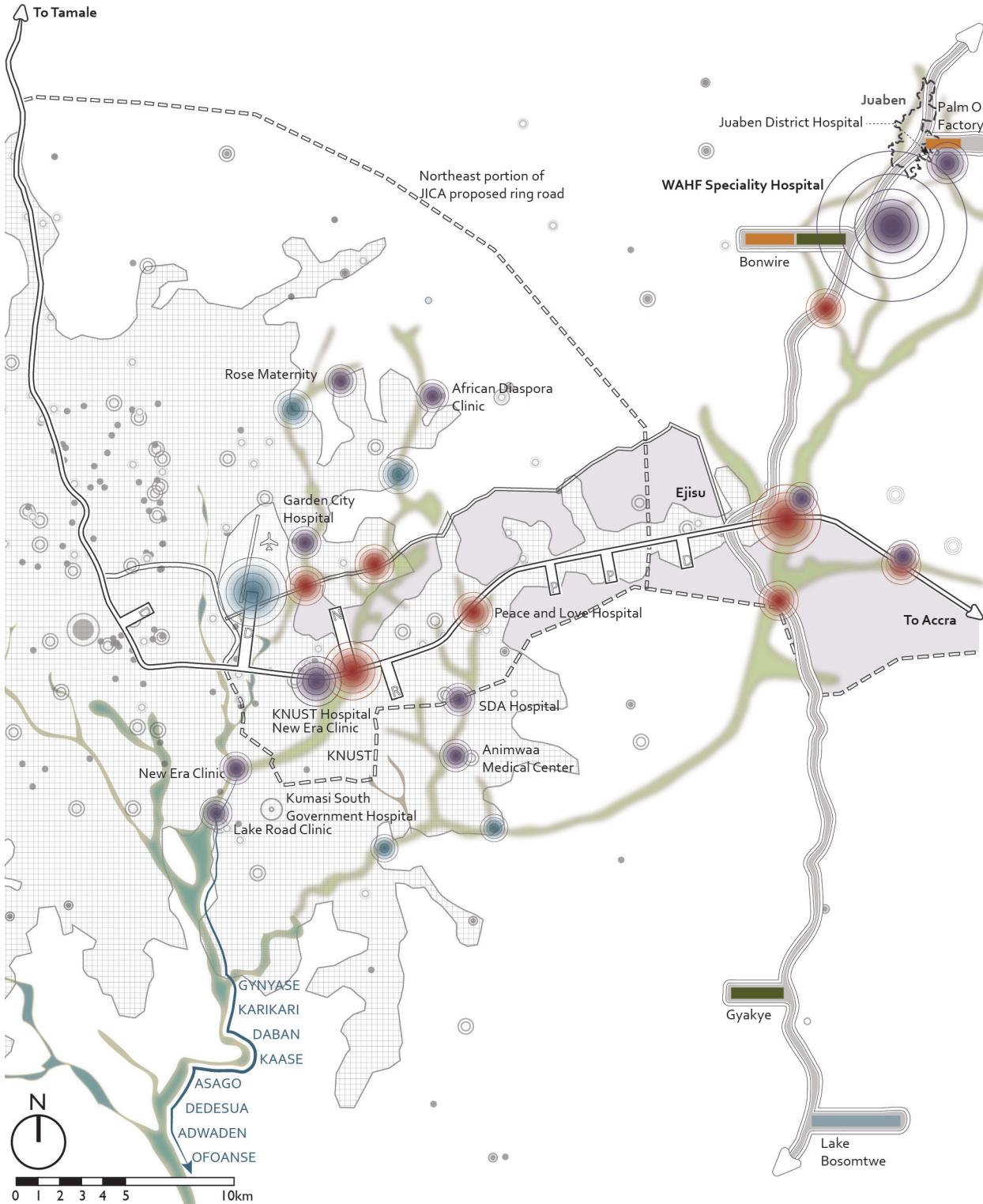
Photograph taken of the WAHF Specialty Hospital site near Juaben.

The fast growing population of Kumasi is putting immense pressure on key infrastructures, natural ecology and, most importantly, the health of the city. This project focuses on the concept of "holistic health" as a source for development of the Kumasi region. The strategy is tested within a rural site where WAHF's Specialty Hospital is proposed to be located.

The comprehensive system that has been proposed addresses various elements of holistic health such as the healthcare system, traditional herbal medicines, aspects of eco-therapy, the allopathic pharmaceutical industry as well as waste management. This project proposes a strategy that synthesizes these elements in order to have a meaningful impact on the overall health of the city of Kumasi.

Kumasi's landscape currently consists of a series of ecological corridors, "eco-corridors," that transverse the city, creating spinal connections through its fabric. These lands fall under the authority of the Traditional Chiefs but are presently threatened by sprawl and encroachment of housing, informal commerce, agriculture, industry and waste. These corridors can be safeguarded by development of productive ecological canopies and sustainable harvesting while contributing to the region's economy.





The pharmaceutical industry has been noted as an essential area of investment for the city of Kumasi. (Invest in Ghana: Focus Kumasi, MCI 2008) Favorable political policies coupled with immense human knowledge capital at Kwame Nkrumah University of Science and Technology (KNUST) provide the city with competitive advantages in developing this industry locally. The increase in demand for traditional herbal medicines suggests an opportunity for developing an agro-industrial sector focused on the production and distribution of these herbs—85 percent of which grow naturally in the region's climate. A transport and distribution corridor along the Tamale-Accra road, along with proposed airport upgrades and a new ring road proposal, strategically connects Kumasi to the rest of Ghana, as well as the sub-Saharan region, for the sale and distribution of these products.

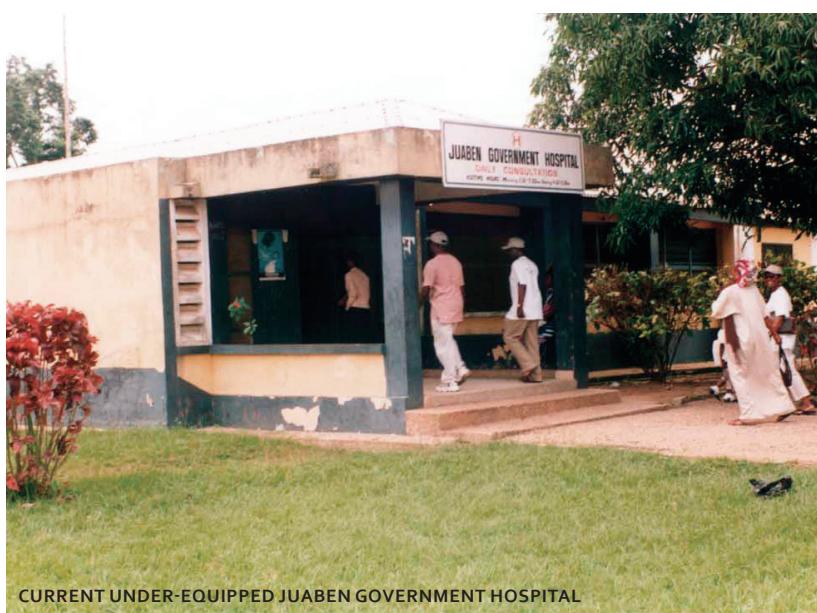
Severe environmental degradation and frequent epidemics should also motivate the city to urgently develop new treatments and drugs. The eco-corridors, mentioned above, are largely threatened by poor waste management. Providing a new system of collection as well as co-composting household and human wastes can begin to reduce the contamination of the city's waterways. Currently filled with various types of waste, these waterways are distributing water-borne disease through direct human contact, dispersed agriculture irrigation and mosquito proliferation. Cleaner irrigation water and increased availability of compost would enable farmers to reap higher yields as well as diminish the spread of disease.

LEGEND

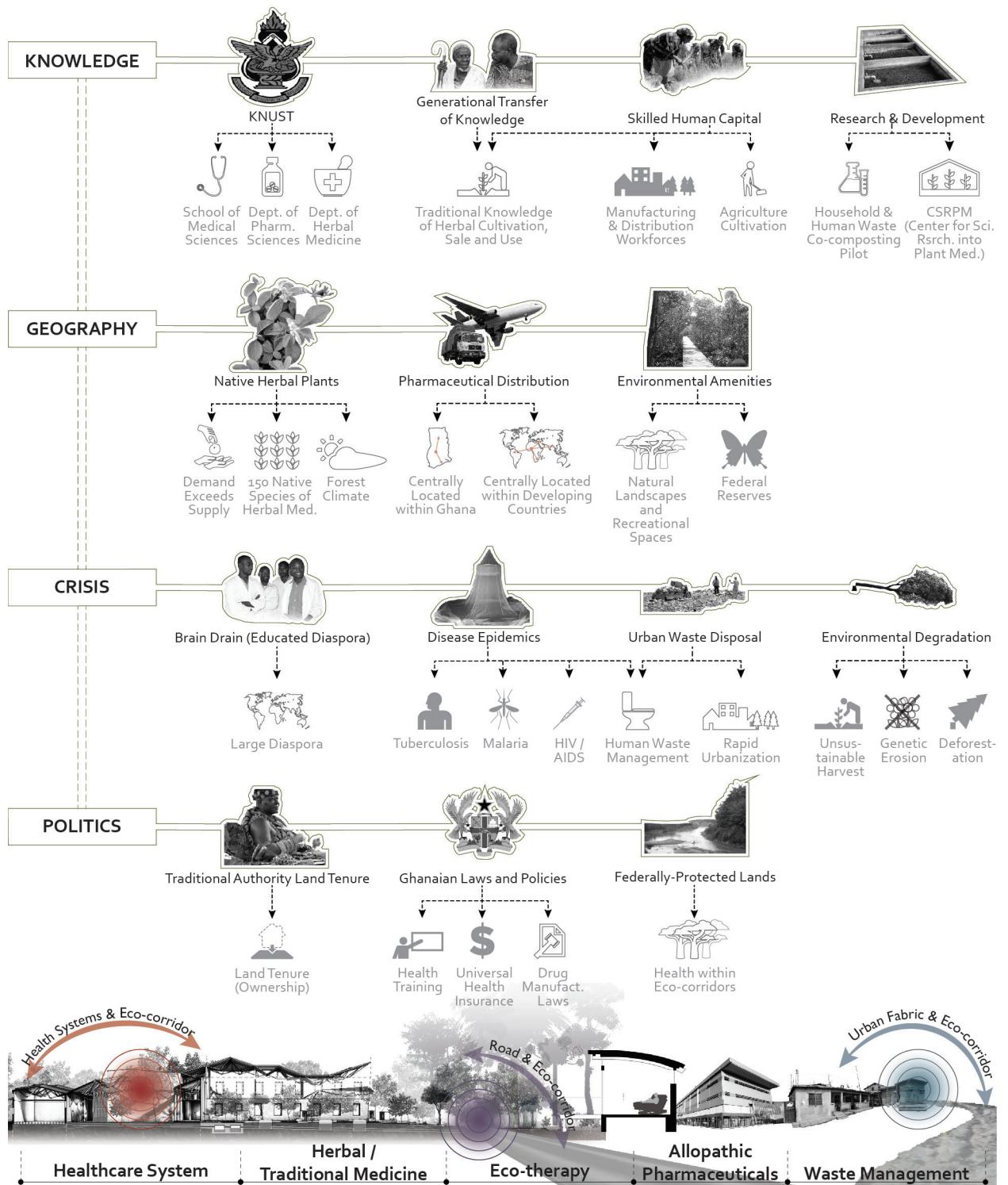
Proposed JICA Roads	— — —
Health Facilities	●
Eco-corridor meets Roadways	(red circle)
Eco-corridor meets Growing Urban Fabric	(blue circle)
Eco-corridor meets Health Facilities	(purple circle)
Pharmaceuticals Production	P
Pharmaceuticals Distribution	D
Herbal Medicine Nurseries	N
KNUST Research	R
Nature Reserves / Sanctuary	G
Tourist Attractions	B
Water Bodies	W
Urban Areas	U

From the point of view of holistic health, the eco-corridors and pockets of nature embedded within urban and architectural environments can support healthier lifestyles and healing of the sick. This strategy is manifested within the design of the Specialty Hospital for the West African Health Foundation (WAHF) in the rural town of Juaben. Designed as a series of programmatic nodes interwoven with open-air circulation, courtyards and a productive landscape, the hospital's patients will be able to take advantage of these broadened concepts of holistic health. The intersection of the ecological and architectural canopies has been developed to enable nature to be an integral part of the hospital. In this way, the building design embodies the values of holistic health and proposes an image that will inspire future developments to incorporate these design philosophies.

The physical hospital design, as well as WAHF's mission and goals, will help to fulfill a vision for Kumasi where holistic health is a central component of a well-developed and equitable society. Ghana and Kumasi have several key advantages—knowledge, geography, crisis and politics—that uniquely facilitate the success of the proposed WAHF hospital in the region. With this comprehensive approach to health which includes the healthcare system, herbal medicine, eco-therapy, pharmaceuticals and waste management, the hospital's impact can reach far beyond the bounds of its physical site in rural Juaben.



ADVANTAGES FOR HOLISTIC HEALTH IN KUMASI



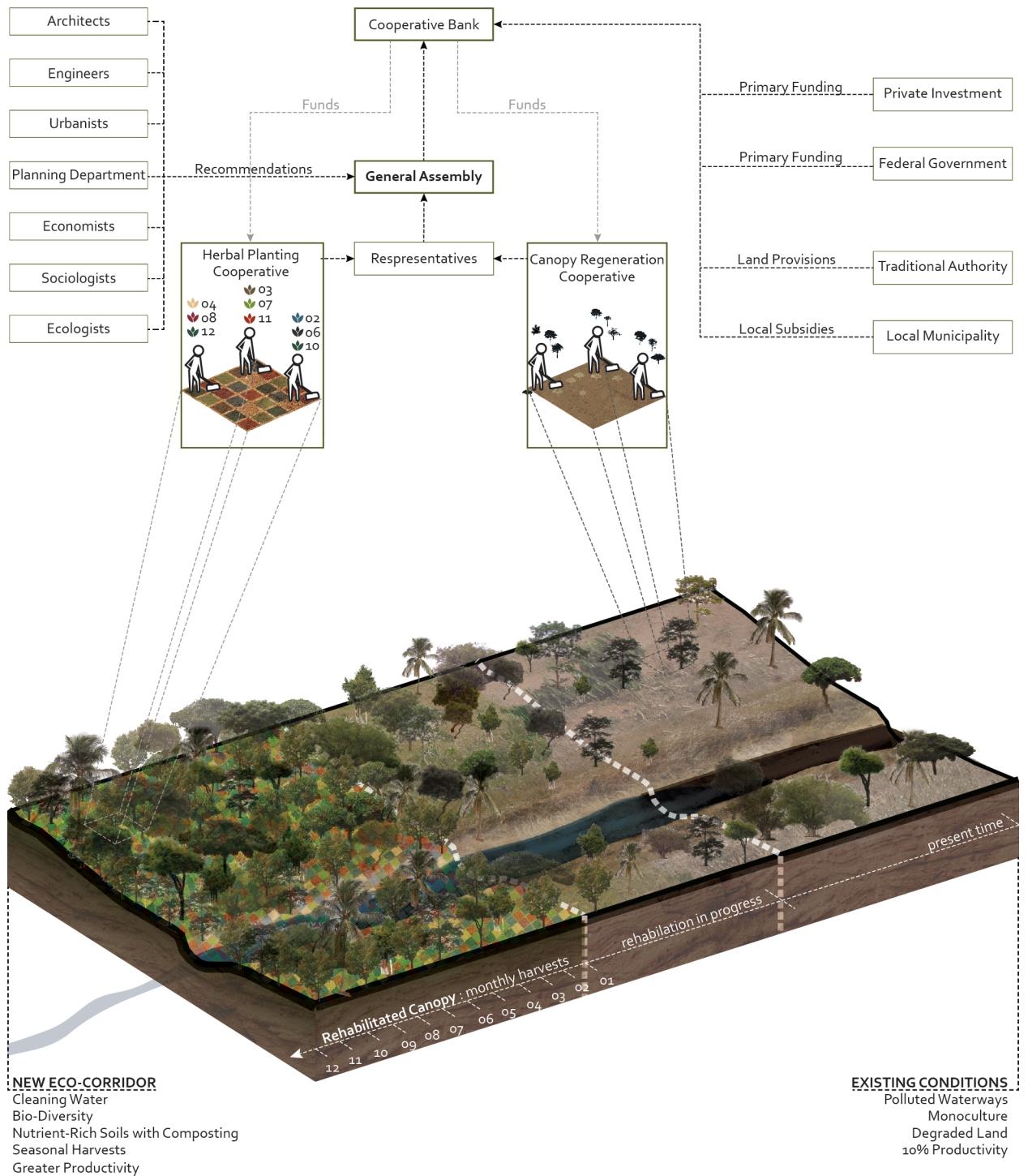
Kumasi—once known as the Garden City of West Africa—faces great challenges in preserving and utilizing the lush protected lands along its waterways. These lands are the city's key environmental infrastructure. The rapid encroachment from increasing population and agriculture has inflicted immense pressure on these eco-corridors. Illegal housing and chemicals used in agriculture have had adverse effects on the quality of the waterways and adjacent lands.



For these reasons, bottom-up cooperative models of development are proposed to remediate the waterways, as well as to play an important role in improving the socio-economic conditions of local communities. This cooperative organizational system will provide both economic and social benefits—strengthening community networks and reinforcing the importance of cooperation and education through waste management and medicinal plant production strategies. In the Ghanaian dual political system, traditional authorities have complete ownership of the land and therefore have an important role to play land development and preservation, and the elected government will continue to have a policy-making and enforcement role within the strategy proposed.

With the cooperation of both the traditional and political authorities, the enhanced productivity proposed for the ecological corridors will be secured by the herbal cooperatives, freeing the governmental powers from the insurmountable task of patrolling and enforcing protection zones. The public health impacts and economic benefits are expected to be significant, with cleaner water supply for downstream irrigation, nutrient-rich topsoil, a new herbal medicine economy and the re-establishment of a diverse ecological canopy.

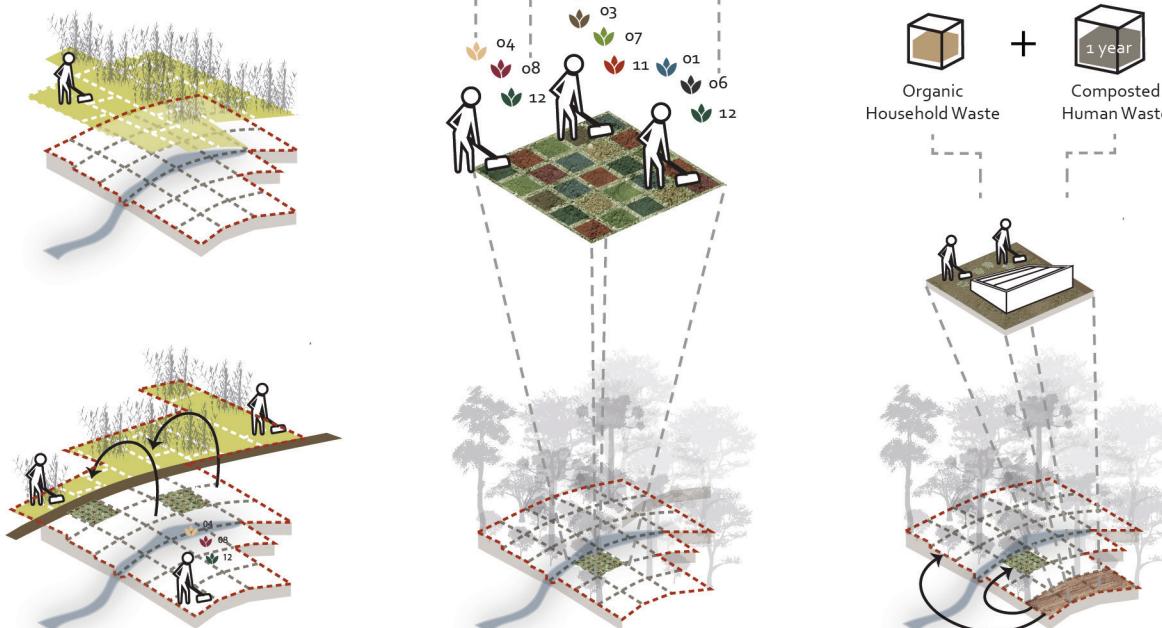
A SYSTEM OF PRODUCTIVE ECO-CORRIDORS



SUSTAINABLE HARVESTING OF ECO-CORRIDORS



Rauvolfia vomitoria Tamarindus indica P. angolensis Vitellaria paradoxa



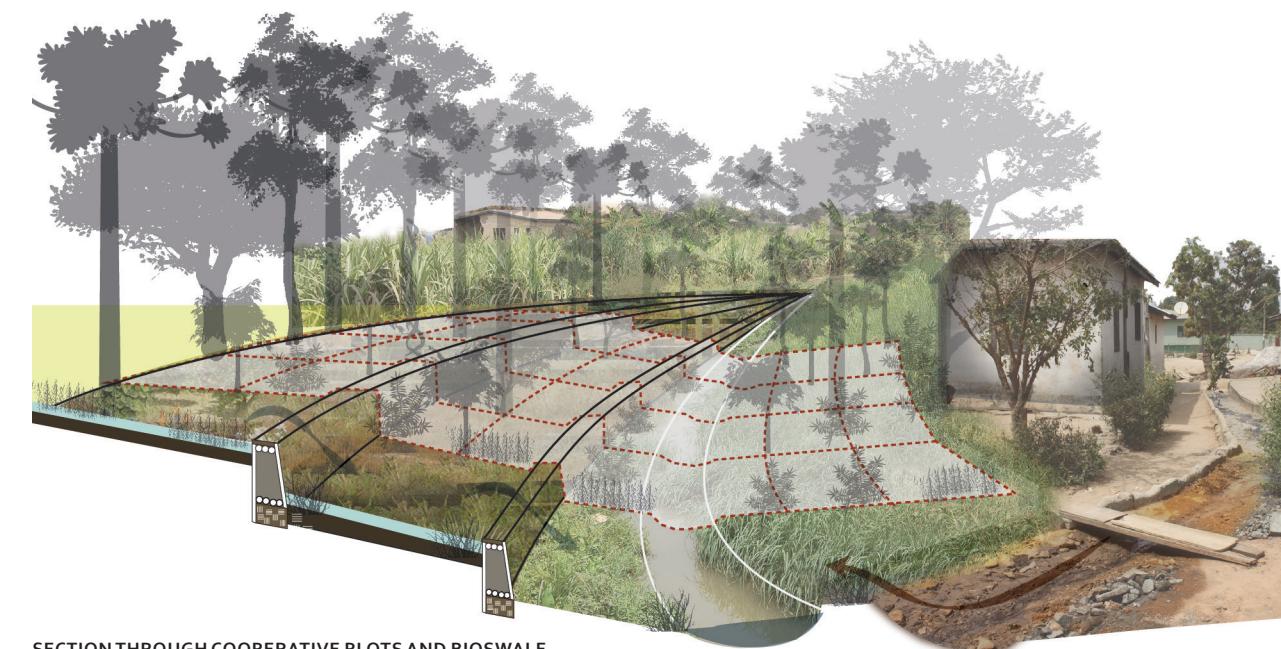
LAND READJUSTMENT OF AGRICULTURE
PLOTS: CONSOLIDATION OF GOVERNMENT
PROTECTED LANDS

SELECTIVE HARVEST MEDICINAL COOP-
ERATIVES: RESTORATION OF PRODUCTIVE
LANDSCAPES

WASTE CO-COMPOSTING PROCESS:
REPLENISHMENT OF SOIL AND WASTE
MANAGEMENT

The natural canopy in Kumasi's semi-deciduous forests hosts over 150 species of native plants, which provide a variety of nutritional benefits and herbal uses in the medicinal and construction industries. Environmental degradation and unsustainable harvesting have made many of these plants extremely rare, while the demand for the same continues to rise in local markets. Harvesting can be made more sustainable through cooperatives using a method known as selective harvesting. With a selective harvesting method, farmers only harvest a portion of the intended crop from within the ecological canopy while leaving the rest for natural seeding and regeneration. This method allows yields several times in a year as a diversity of coexisting crops with varying harvest seasons can be grown within the same plots.

It is proposed that these herbal cooperatives also help create a system of bioswales, co-composting and herbal production as a measure to prevent informal encroachment into these lands while also contributing to the cleaning of the waterways throughout the region. In summary, strategies of remediation and prevention should be employed throughout Kumasi's eco-corridors to protect this important green infrastructure.



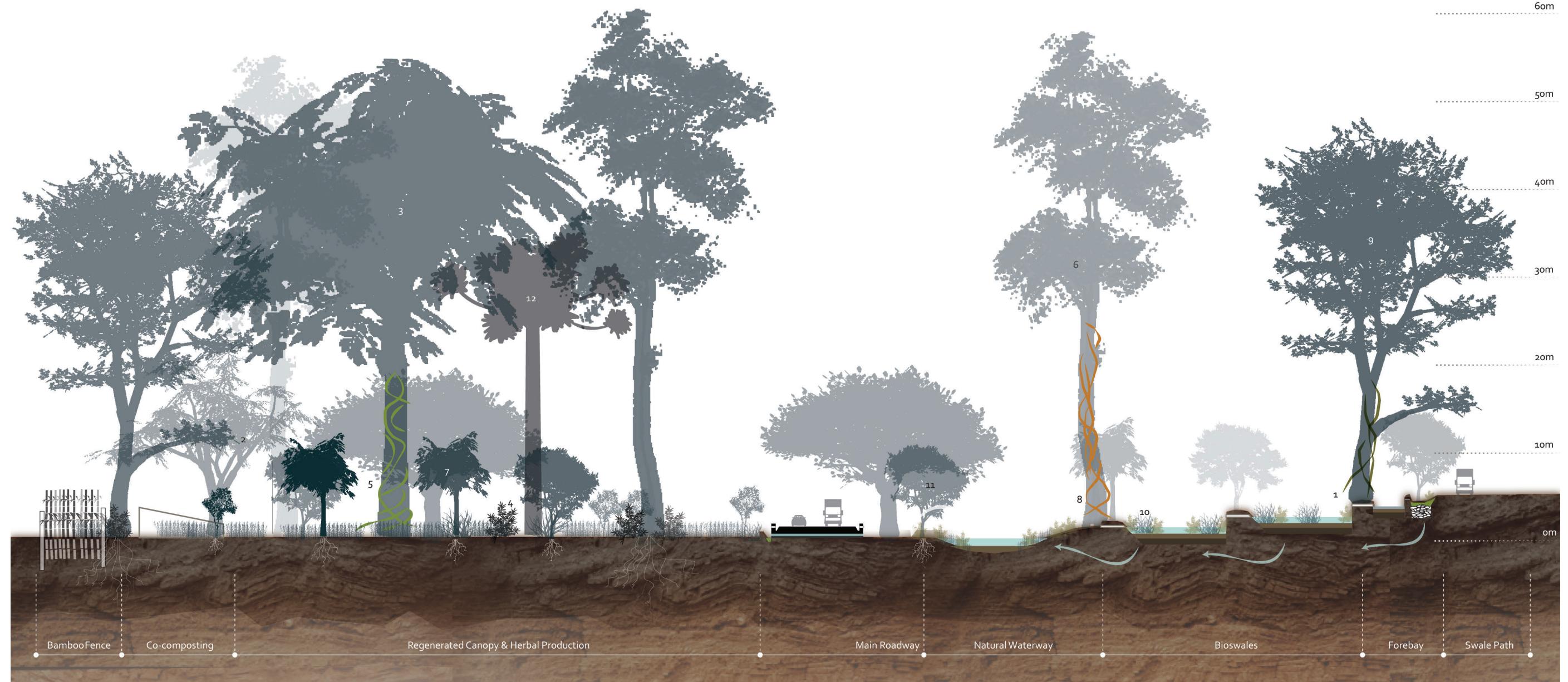
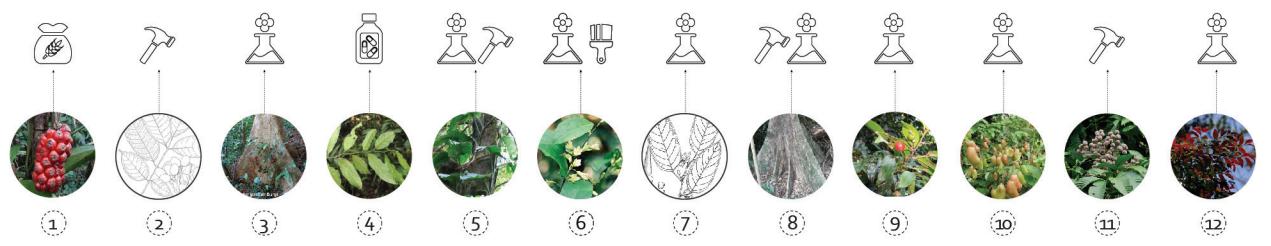
SECTION THROUGH COOPERATIVE PLOTS AND BIOSWALE

REGENERATING THE DIVERSE CANOPY WITHIN THE ECO-CORRIDORS

1. Cercestis afzelii
2. Dacryodes Klaineana
3. Guarea cedrata
4. Microdesmis puberula
5. Culcasia angolensis
6. Calycobolus africanus

7. Baphia nitida
8. Nesogordonia papaverifera
9. Celtis mildbraedii
10. Griffonia simplicifolia
11. Lecaniodiscus cupanioides
12. Diospyros abyssinica

- DIVERSE USES**
- ↗ Construction
 - ↘ Food Source
 - ⤒ Herbal Medicine
 - ⤓ Allopathy
 - ⤔ Paint



THE WAHF SPECIALTY HOSPITAL IN JUABEN

Photograph taken of the WAHF Specialty Hospital site near Juaben.

SITE INTRODUCTION

A 10 acre plot of land was acquired in Juaben by WAHF from Nana Otuo Siriboe II and his Traditional Council for the hospital project in 2007. Juaben is located in the Ejisu-Juaben Municipal District which is one of the 27 districts in the Ashanti Region of Ghana.

Juaben is 20 kilometers from Kumasi—the second largest city in Ghana. Kumasi which has a population of 2 million, is the regional capital of the Ashanti region with a population of 5 million. Approximately half a kilometer from the center of Juaben, the 10 acre site is accessed by the Effiduasi-Ejesu Road. Triangular in shape, with one side adjacent to the road, the site slopes down gently towards an eco-corridor located on the southeast.

The location of the WAHF Specialty Hospital at Juaben in proximity to Kumasi was chosen for several advantages:

1. With a robust economy, Kumasi is centrally located in Ghana and West Africa.
2. With a high population density and proximity to major southern and northern towns and districts, the Kumasi metropolitan region is in great need of new and improved health facilities.
3. A proposed in-land port and trans-shipment center at Boankra is located a few kilometers away from Juaben and could be useful in buying, selling or distributing medical supplies in the nation. This transport and distribution center could become incredibly important as herbal medicine is developed from plants cultivated locally.
4. A proposed Kumasi airport expansion along with the new outer ring road is likely to increase regional, national and international access to and from the town of Juaben.
5. The Kwame Nkrumah University of Science and Technology's School of Medical Sciences, the Department of Pharmaceutical Sciences and the Department of Herbal Medicine are located less than 10 kilometers from the proposed hospital.

*Authored by Victor Body-Lawson
Faculty member, Urban Design Program, GSAPP*

WAHF'S SIGNIFICANCE IN KUMASI'S HEALTH SYSTEM

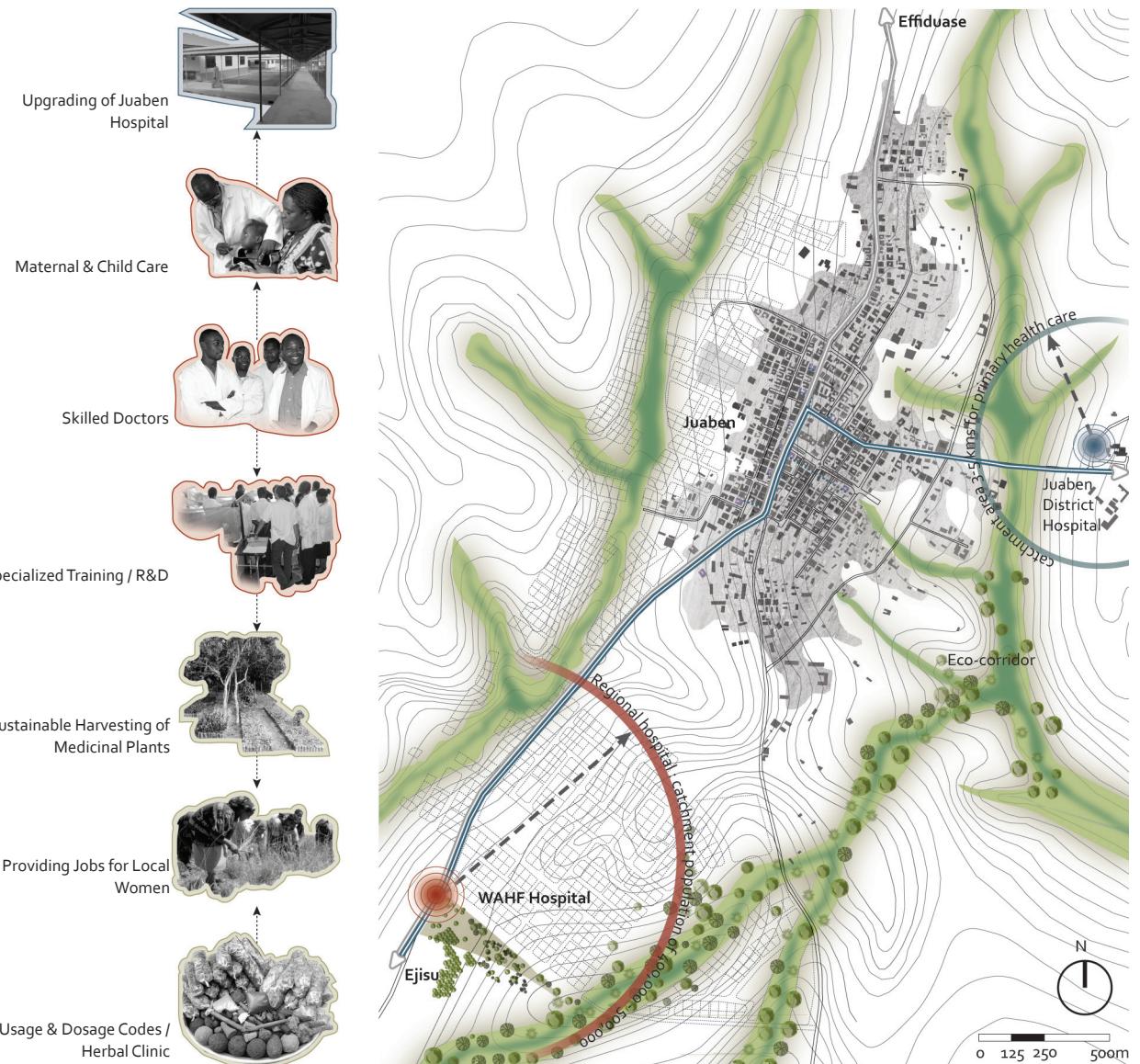
WAHF has a vision establishing a specialty hospital vital to the whole of West Africa. In addition, it aims to provide support, education, faculty and equipment to other clinics and health centers, especially in rural communities. Disease prevention, health education and primary care are more successful and cost effective on a population-wide basis and should be encouraged and fostered in this part of the world where resources devoted to healthcare are limited. The envisaged specialty hospital shall provide the following:

1. Tertiary care for the entire sub-region
2. Post-graduate training for healthcare providers of the sub-region
3. Teleconference and distance learning center
4. Facilities to conduct forums, workshops and conferences
5. Research facilities for epidemiology, medicinal plants and nutrition

WAHF will target its services to 3 main principal markets: (1) the local Ghanaian market, both poor and affluent, (2) the larger African market especially in the West African sub-region and (3) the expatriate market. WAHF will utilize its pricing subsidy mechanism to ensure treatment of poor and underserved populations.

Operationally, WAHF realizes that the bulk of its patients will have extremely low income—some of whom will be covered under the National Insurance Health Scheme. The rest of the patients will include those covered under private health insurance and those not covered or enrolled in any health plan. Additional fees will be charged from affluent patients who require private or semi-private rooms. This combination of economies of scale, cross-subsidies and vertical integration will make the project more sustainable.

With an extremely high maternal and child mortality in Ghana and a severe brain drain among Kumasi's health professionals, the WAHF Hospital has the opportunity to become a leading hospital locally in Kumasi as well as internationally in the larger sub-Saharan region. Focusing on these health issues and providing specialist care, while training and retaining skilled doctors, WAHF creates a holistic approach to the role of a Ghanaian hospital. This approach is not only programmatic but also includes herbal medicine and nature as part of the healing process. The research and development center in the hospital is expected to provide an ideal platform for generating dosages and codes for the herbal medicine practice in the country.



The hospital also is expected to play an important role in the development of the town of Juaben, where men and women could be employed in the herbal and therapeutic center. The town itself will benefit from lodging and dining businesses that will be needed to serve visitors that come to the hospital. Shuttles operating between Juaben, Ejisu, Kumasi and the hospital will assist in transporting patients to and from the facility.

HEALTHCARE INNOVATION: HERBAL MEDICINE DEVELOPMENT



Herbal plant cultivation and sustainable harvesting

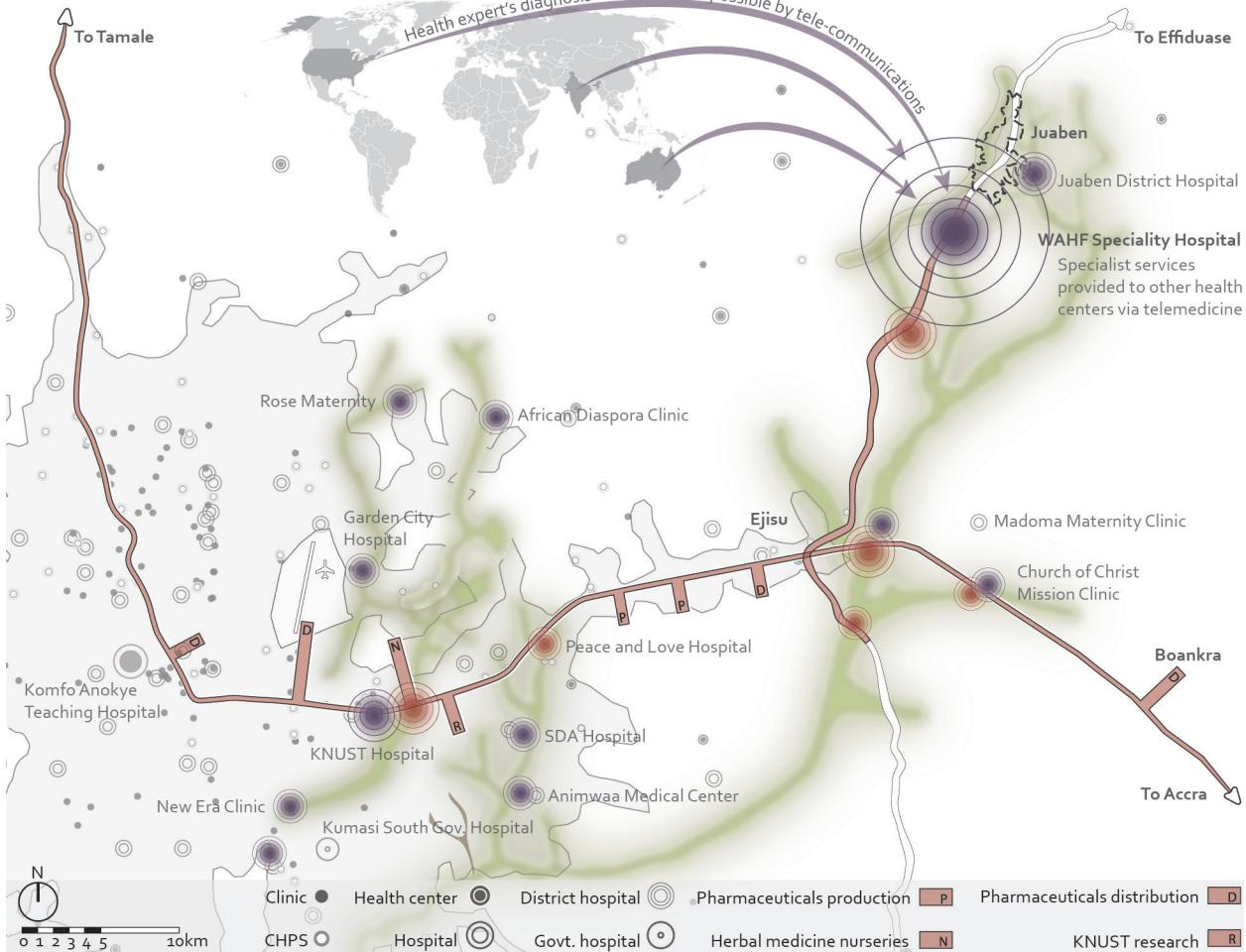


Research and development: Herbal medicine dosage and codes



Collection of raw materials; production and distribution of pharmaceuticals

HEALTHCARE INNOVATION IN KUMASI



HEALTHCARE INNOVATION: TELEMEDICINE

BENEFITS OF TELEMEDICINE



Modern technology like telemedicine kits allow for better healthcare in rural areas



Eliminates travel costs for patients - especially helpful for pregnant women



Educational benefits - doctors and nurses become more aware of health issues



Equity of access to quality health care provisions in rural populations

POTENTIAL ROADBLOCKS



Equipment breakdown



License issues across jurisdictions



Poor Internet access



Instability of electricity supply

TYPES OF TECHNOLOGIES

Store and Forward



Telepathology, teleradiology

Two-way Interactive



Interactive television (IATV)



Health professionals



Doctor & patient



Current methods of interaction

Existing institutions in Kumasi such as the KNUST School of Medical Sciences, the Department of Pharmaceutical Sciences and Herbal Medicine along with the Centre for Scientific Research into Plant Medicine provide key knowledge capital for furthering the herbal medicine industry. Advanced technology and telemedicine will be used by WAHF for multiple purposes such as cardiology, pediatrics and gynecology among others. The hospital is envisioned as a pioneer for this technology in the Ashanti region.

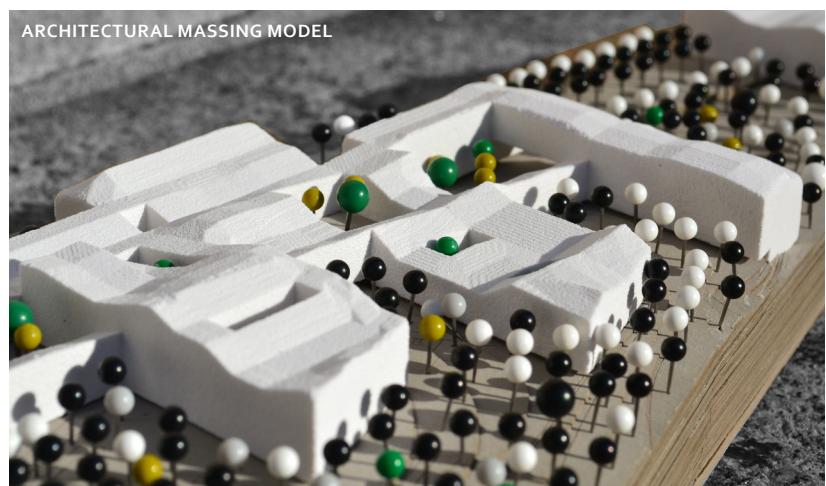
DESIGN OF THE HOSPITAL

WAHF plans to build a “green” healthcare facility that will provide a serene ambiance for holistic healing, accommodations for family members of out-of-town patients, a same-day surgery center and a 24-hour pharmacy within the complex. Programmatically, the WAHF Hospital at Juaben will fill the void and unmet demand in the sub-region for specialist cardio-thoracic care, lung diseases, eye, ear, nose, throat, bone and joint problems, obstetrics, gynecology, infertility, pediatrics, skin, reconstructive surgery, immunology/allergy, tropical and infectious diseases.

The proposed WAHF Specialty Hospital shall be constructed in stages. The initial stage will include the establishment of a 50-bed women and children’s center. The other programs will be phased in over time.

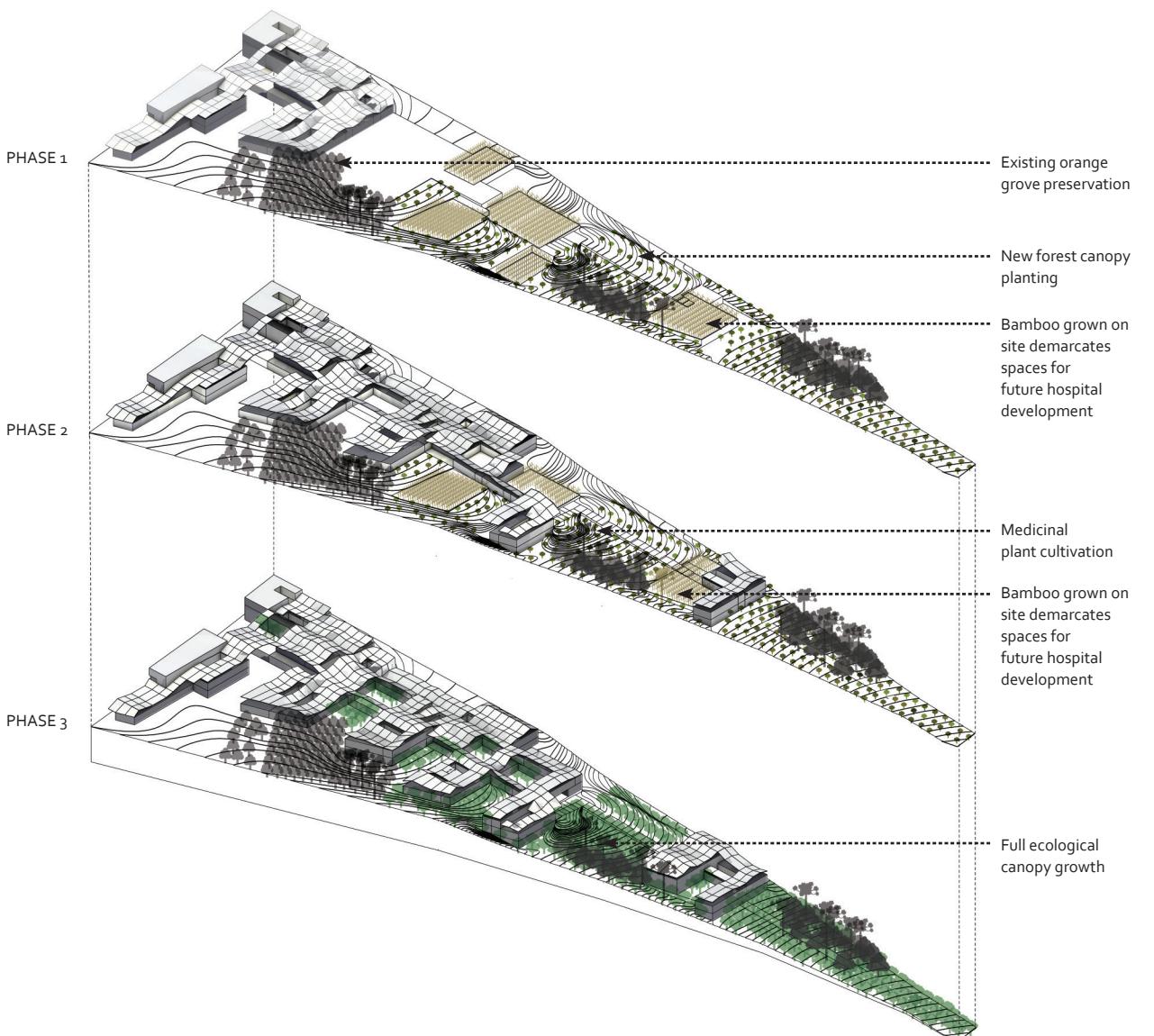
The conceptual site strategy for the hospital will incorporate vehicular entry from the main road with an adjacent parking area, a service road and drop off for ambulances on the northern edge of the site. There will be separate dedicated hallways for medical staff, patients and visitors.

Designed as a series of programmatic nodes interwoven with open-air circulation, courtyards and a productive landscape, the hospital’s patients will be able to benefit from the holistic health oriented facility. The combination of the ecological and architectural canopies will embody the concept of nature complementing the formal volumes of the hospital. Through its design, the building will emphasize the value of holistic health and inspire similar building typologies in Kumasi.

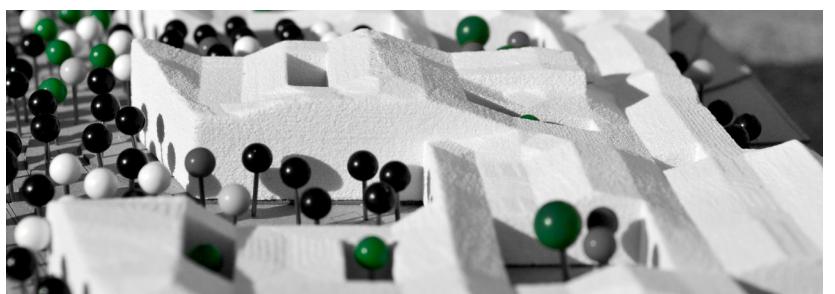
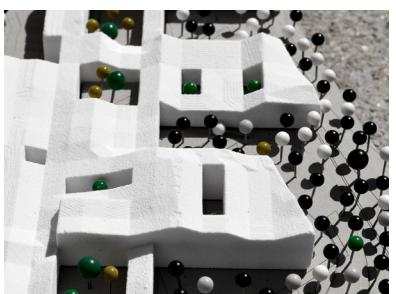


ARCHITECTURAL MASSING MODEL

A GROWING HOSPITAL: PHASING STRATEGY



PHYSICAL MODEL



GUIDING PRINCIPLES FOR DESIGN

SITE CONDITIONS

Utilizing existing topography, the building is designed to step down to various levels allowing for healing views and interaction with nature for all patients and staff. A gradual progression from public to private spaces has been planned, placing the more public programs near the main road and the more private, in-patient facilities toward the interior of the site.

FORMAL STRATEGY

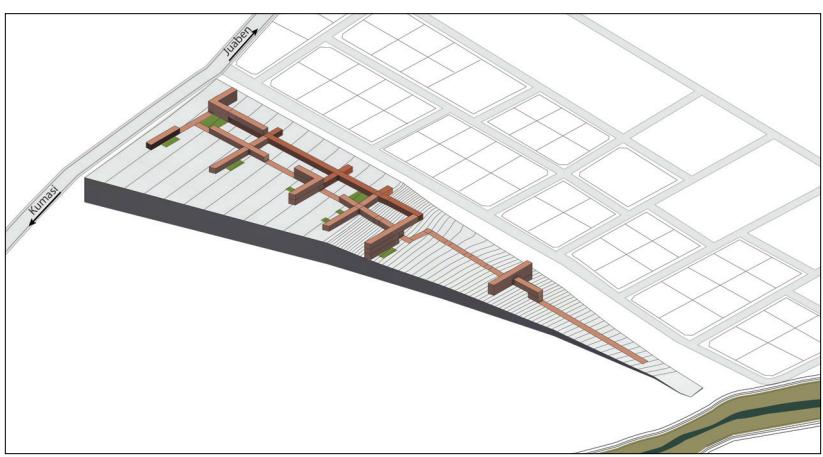
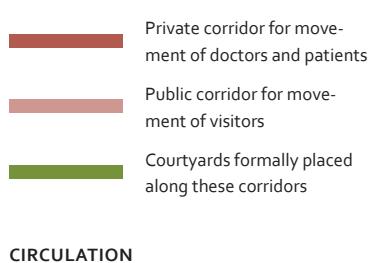
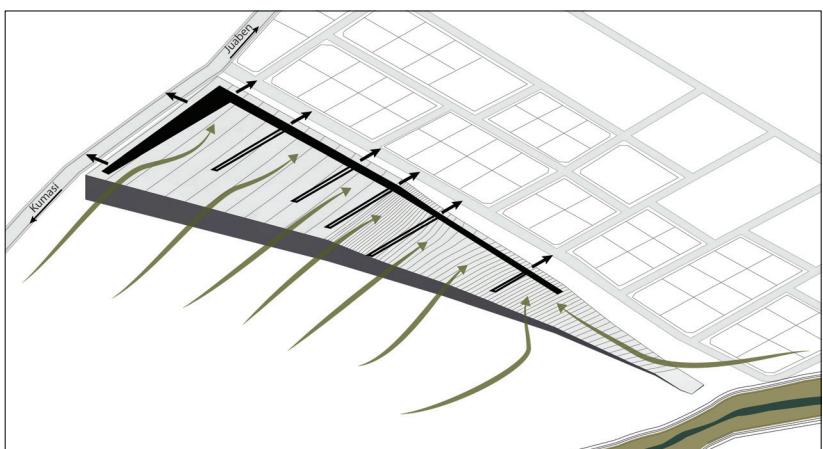
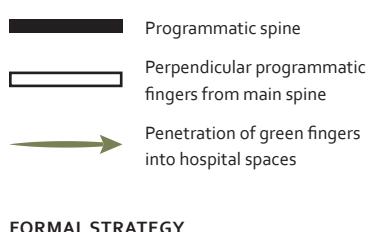
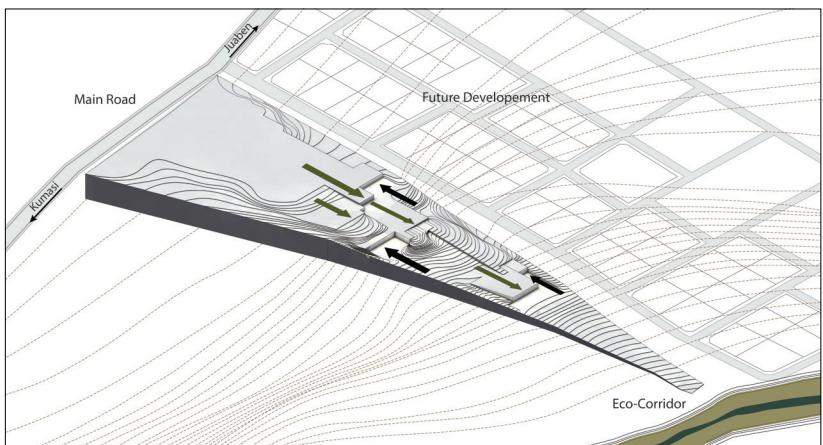
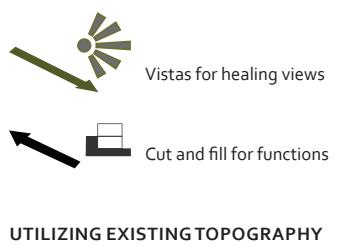
The formal organization of the hospital was developed to address issues of circulation, services and security among others. The strategy consists of a spine, adjacent to the roads north and east of the site, which houses the permanent uses of the facility. A series of axes, perpendicular to the spine, interlace the ecological canopies with the overarching architectural canopies of the built structure. In response to its immediate context, the primary spine will create a visible barrier from the currently proposed suburban-style development on the northern side, and the interwoven canopies can relate more directly to the open spaces and potential school facility to the south.

CIRCULATION

Emanating from the formal system of the spine and cross-axes, two parallel circulation corridors are established. The first is private—a short and direct route, providing quick and discrete access between critical uses within the building. The second is public—a scenic route oriented toward the interior courtyards. It will provide visitor access to the patient rooms and outpatient facilities. Although second floor spaces have been planned for specific functions, elevators are generally discouraged in rural Ghana for their electrical load requirements and limited reliability of the electricity distribution system. Therefore, the majority of the hospital is oriented horizontally.

HOLISTIC HEALTH

The health of people cannot be addressed by allopathic medicine alone. One can understand health's broader effects by looking at it holistically. Exposure to sunlight and nature through exterior views and outdoor pathways can greatly enhance patient recovery. The hospital design incorporates these natural experiences with its axial form and interior courtyards. Through preservation of existing tree canopies and the regeneration of diverse indigenous ecological structure, the design proposes a sustainable and low maintenance outdoor extension of the hospital.



COURTYARDS

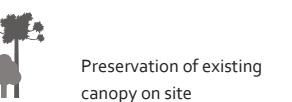
In addition to the holistic health benefits of the interior courtyards, they are also designed to provide other essential services. Firstly, they will serve as visual markers (landmarks) for navigation of the users through the facility. Their contribution to passive, sustainable design includes provision of natural ventilation and lighting which can greatly reduce electrical consumption of the hospital.

PASSIVE PERFORMANCE

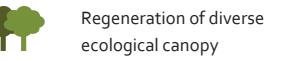
An important element of this proposed concept for a sustainable building that is energy efficient with minimal carbon footprint (especially within the context of a city that struggles to provide constant electricity supply) is the roof structure. A modulated construction allows maximum exposure of solar panels to the sun, while also collecting rainwater for irrigation purposes within the site. The interior courtyards allow natural light to permeate into the hospital spaces and facilitate cross ventilation. Passive cooling systems have been incorporated into the building by lifting the roof structure for increased ventilation in areas of circulation, patient gathering and other public spaces. Formal spaces like operation theaters will remain as controlled environments, with artificial cooling and ventilation systems.

PHASING

Designed to be built in phases, the formal spine and attached axes can begin as a smaller structure adjacent to the Ejisu-Juaben road and eventually expand east into the site as development needs increase and funding becomes available.



Preservation of existing canopy on site



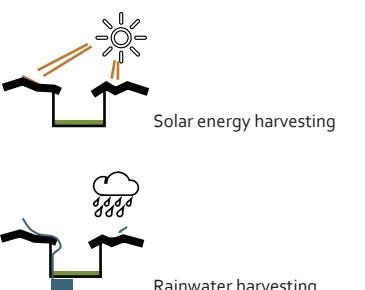
Regeneration of diverse ecological canopy

Integration of hospital spaces within these canopies allows for a healing experience

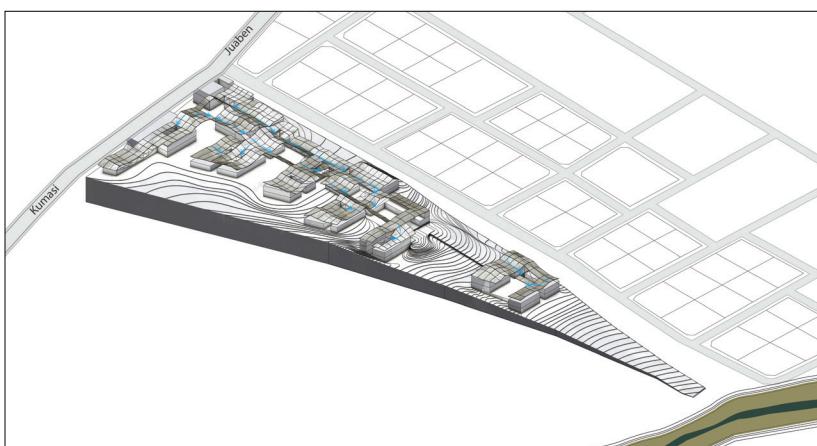
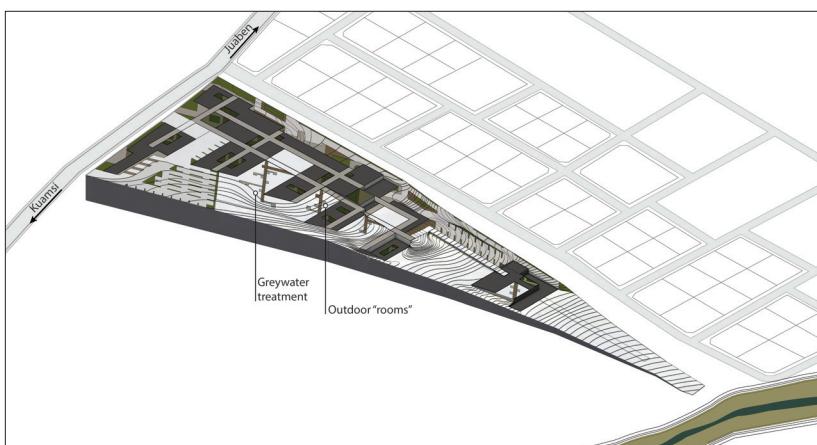
HOLISTIC HEALTH



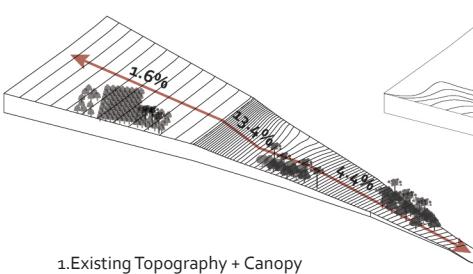
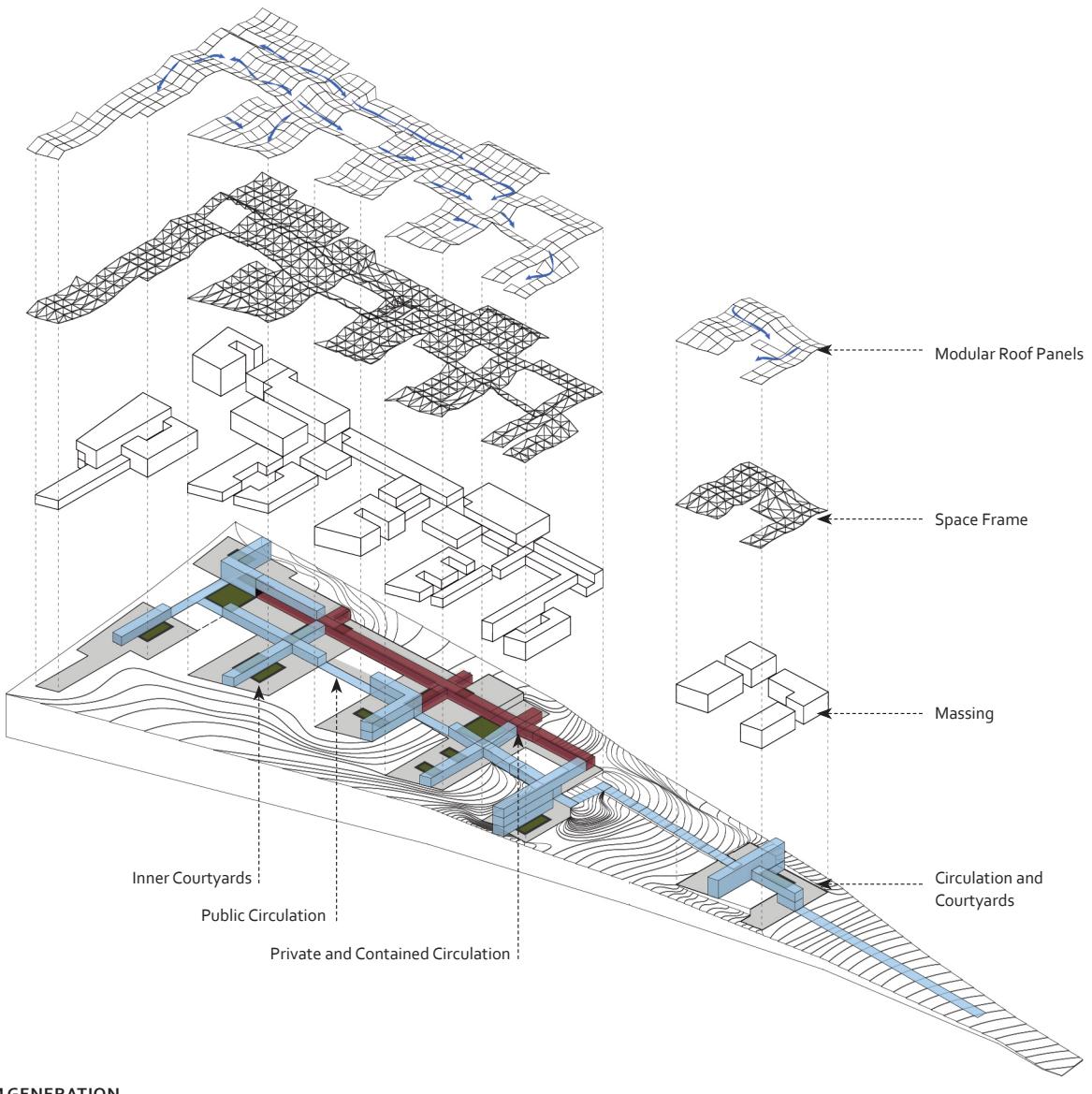
COURTYARD TAXONOMY



PASSIVE PERFORMANCE



DESIGN STRATEGIES: A SUMMARY



DESIGN METHODOLOGY AND EVOLUTION

Comprehensive understanding of the functioning of a hospital through various case studies have helped evolve the proposed plan that addresses issues of efficiency, adjacency of programs, privacy and security. The plan organizes the most public elements of the hospital—primarily the diagnostic and consultation centers—to be easily accessible by visitors. This initial out-patient department is designed to lead into a more private in-patient facility with operation theaters, single patient rooms and wards for men, women and children. Stressing on the importance of herbal medicine, a therapeutic center is located towards the end of the site, along with short-term hotel rooms for patients' families.

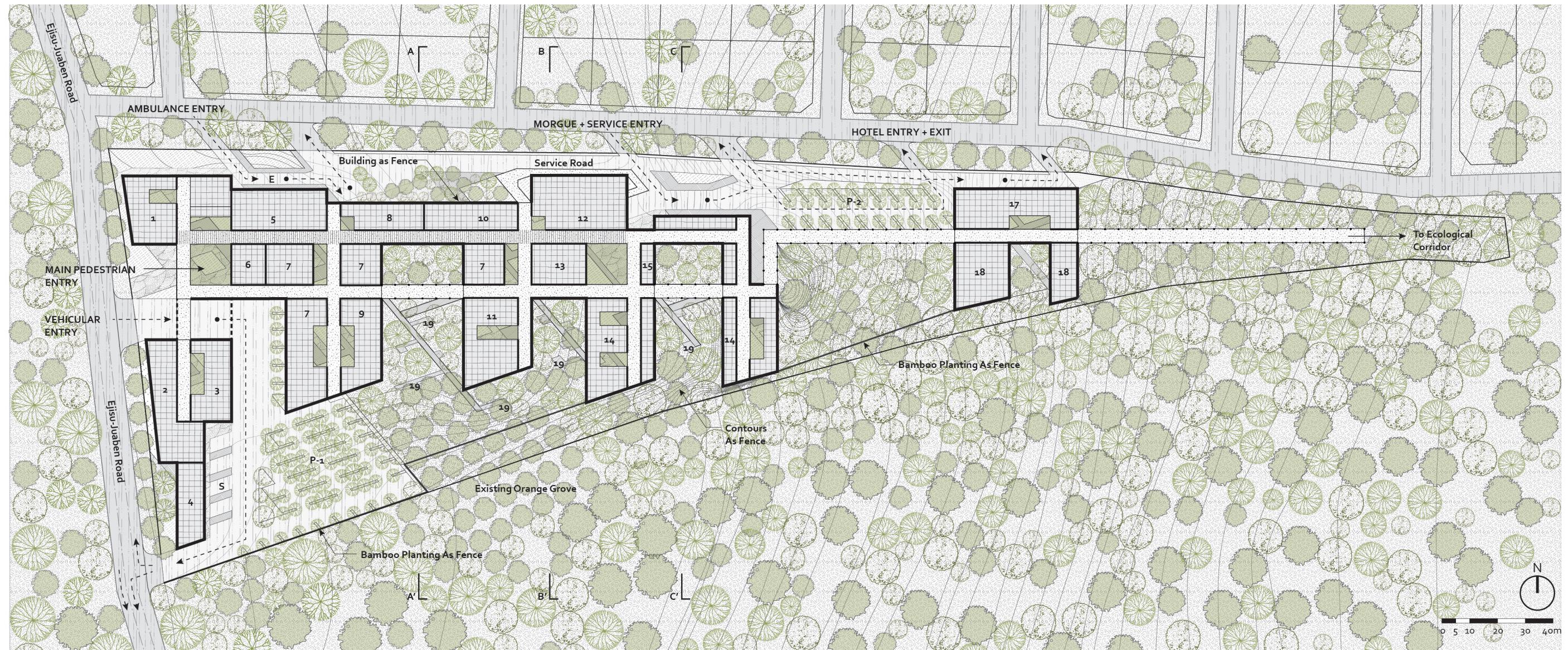


Through each stage of its development, the conceptual plan aims to integrate the formal programs of the hospital with the healing aspect of natural landscapes. These courtyards are designed as formal elements of organization and orientation for users, setting up a rhythm of movement and circulation through the hospital. They allow natural light to flood the corridors and rooms while facilitating cross-ventilation of air in private rooms and public spaces.

SOCIAL CORES – THE ROLE OF THE COURTYARD (SECTION B-B')



SITE PLAN



SITE CHARACTERISTICS

Site Area – 10 Acres (4.03 ha)
 Total build-out area of the hospital – 9,000 square meters
 Total number of beds in final phase – 250
 Phase 1 – 4,000 sq.m – 50 beds

- 1 – Training Center + Auditorium
- 2 – Pharmacy, Administration
- 3 – Blood Bank, R&D
- 4 – Rental Space, R&D
- 5 – Emergency Room, Imaging
- 6 – Reception + Registration
- 7 – Consultation Rooms
- 8 – Emergency Room extension
- 9 – Staff Comfort & Break Area
- 10 – Services
- 11 – Wards
- 12 – Operation Room + Morgue (below)
- 13 – Intensive Care Unit (I.C.U.)
- 14 – Single Patient Rooms

- 15 – Cafeteria
- 16 – Main Kitchen + Dining
- 17 – Hotel
- 18 – Herbal Therapeutic Center
- 19 – Outdoor Rooms
- P – Parking
- S – Shuttle Drop-Off

SECTIONAL UNDERSTANDING OF THE WAHF HOSPITAL



PROGRAMMING THE ACTIVE ROAD-SIDE EDGE



ENTRANCE COURT TO THE HOSPITAL

The entrance facade of the hospital is designed to become a key feature in asserting the presence and identity of the hospital on the main Ejisu-Juaben road. The image of the hospital as a leading center for training as well as research and development is expressed by locating these programs on this facade. The entrance to the building is designed to be set back into a large fore-court that will receive pedestrians. The drop-off area for vehicles is planned beyond a controlled entry point restricting the gathering of informal hawkers. Publicly accessible functions, such as the pharmacy, are also located along this edge for users who only need these services.

The building of the hospital can also set an example for future development along the Ejisu-Juaben road. Although currently a minor road, it will be a heavily traveled artery for the metropolitan region in the future. By the design of its set-backs, a street wall and building height, the proposed hospital can demonstrate best practices for the sustainable urbanization of this road. Also, by incorporating the parking within the site instead of along the street, a precedent will be set for building frontages to be located directly on the street and parking located in the rear.

The placement of the hospital's training center and research and development center at the street in the main large volumes will give these functions the desired prominence and accessibility. The R&D building form can underscore the hospital's commitment to innovation and modernization for the region. It can become a symbol for the development of herbal medicine and help legitimize its uses. These large volumes also become privacy barriers for the less-public function within the central areas of the site.

The hospital is envisioned to be built of a composite structure of local materials such as landcrete and concrete. Bamboo grown on site will be a highly accessible and economical material; while groves will be located on spaces delineated for the future growth of the hospital and can be used in various stages of construction as scaffolding. The project will also capitalize on the region's heavy rainfall by collecting rainwater in storage tanks for irrigation purposes. The solar panels on the roof will use the intense sunlight in Ghana to capture and store solar energy in inverters for restricted uses.

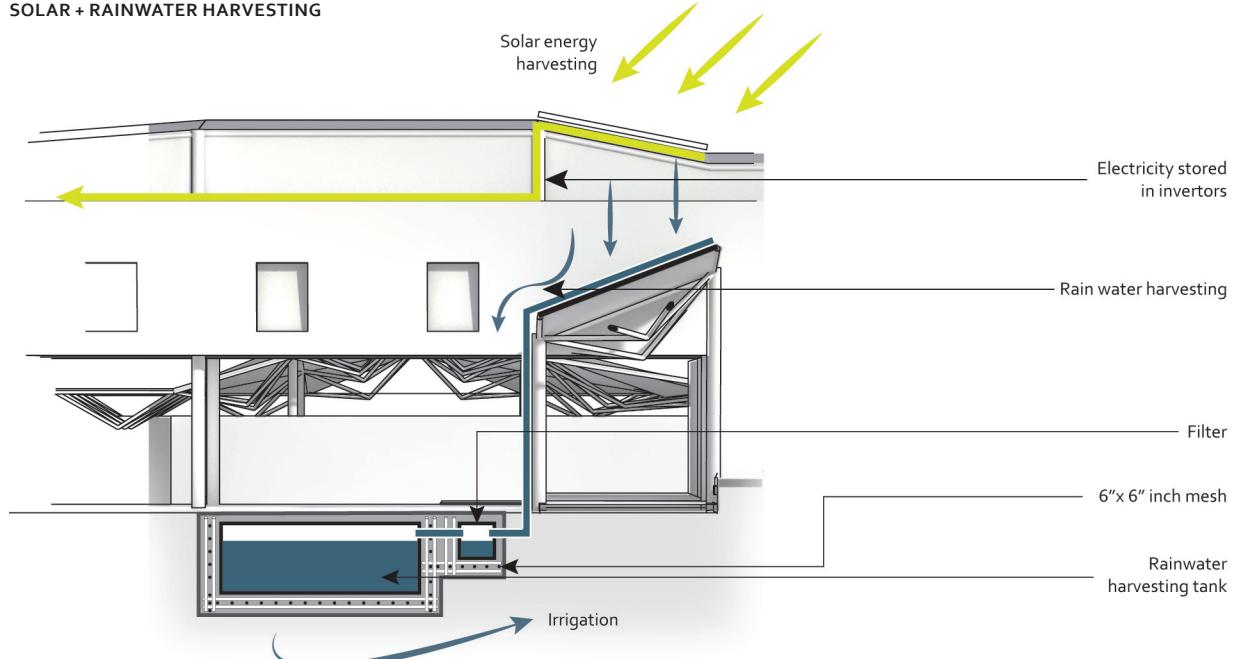
A major focus of the design is the concept of an architectural canopy that integrates the building with the ecological canopy around it. The architectural canopy will provide shade, facilitate ventilation, collect rainwater and host solar panels oriented for capturing maximum sunlight. This canopy will also become the visual identity of the hospital and an element that will unify the various parts of the building. Primarily a space frame that allows for the variations in the roof, the proposed roof structure will be constructed with prefabricated metal members and joinery. Modular sections will allow for the extension of the roof structure along with the future expansion of the formal programs of the hospital.

Other systems in the building include a passive cooling mechanism that deploys fresh cool air within the building floor to keep the overall temperature in control and a cleansing living machine that will filter greywater and feed it back into the flushing tanks in the toilets of the hospital.

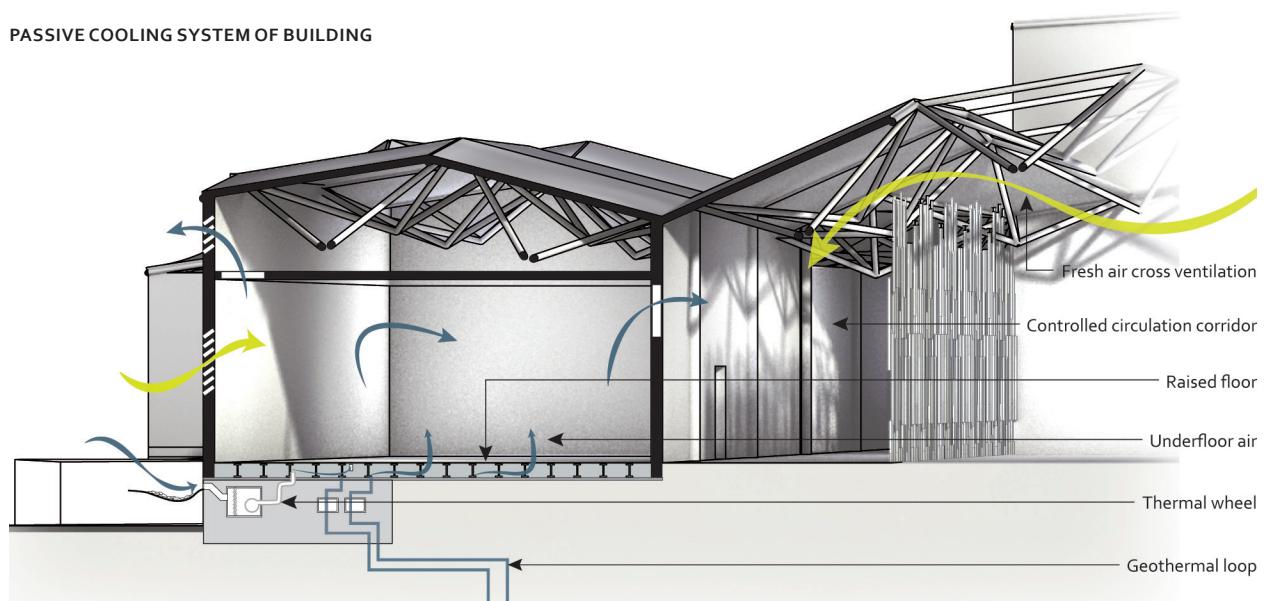
SECTION THROUGH RAINWATER HARVESTING SYSTEM (SECTION C-C')



SOLAR + RAINWATER HARVESTING



PASSIVE COOLING SYSTEM OF BUILDING



SECTIONAL UNDERSTANDING OF THE WAHF HOSPITAL



INTEGRATION OF ARCHITECTURAL CANOPY WITH ECOLOGICAL CANOPY (SECTION A-A')



RENDERING OF HOSPITAL CORRIDOR

In conclusion, the design of the hospital aims to promote the well-being of its patients through the values of holistic health that it embodies. Not only will the facility provide quality modernized care, it will provide a basis for herbal medicine, eco-therapy, pharmaceutical research, medicinal training, waste management and sustainable building, serving as an example of health for all of sub-Saharan Africa.



HEALING AND PRODUCTIVE HOSPITAL ENVIRONMENT

MOVING FORWARD



Photograph taken of the WAHF Specialty Hospital site near Juaben.

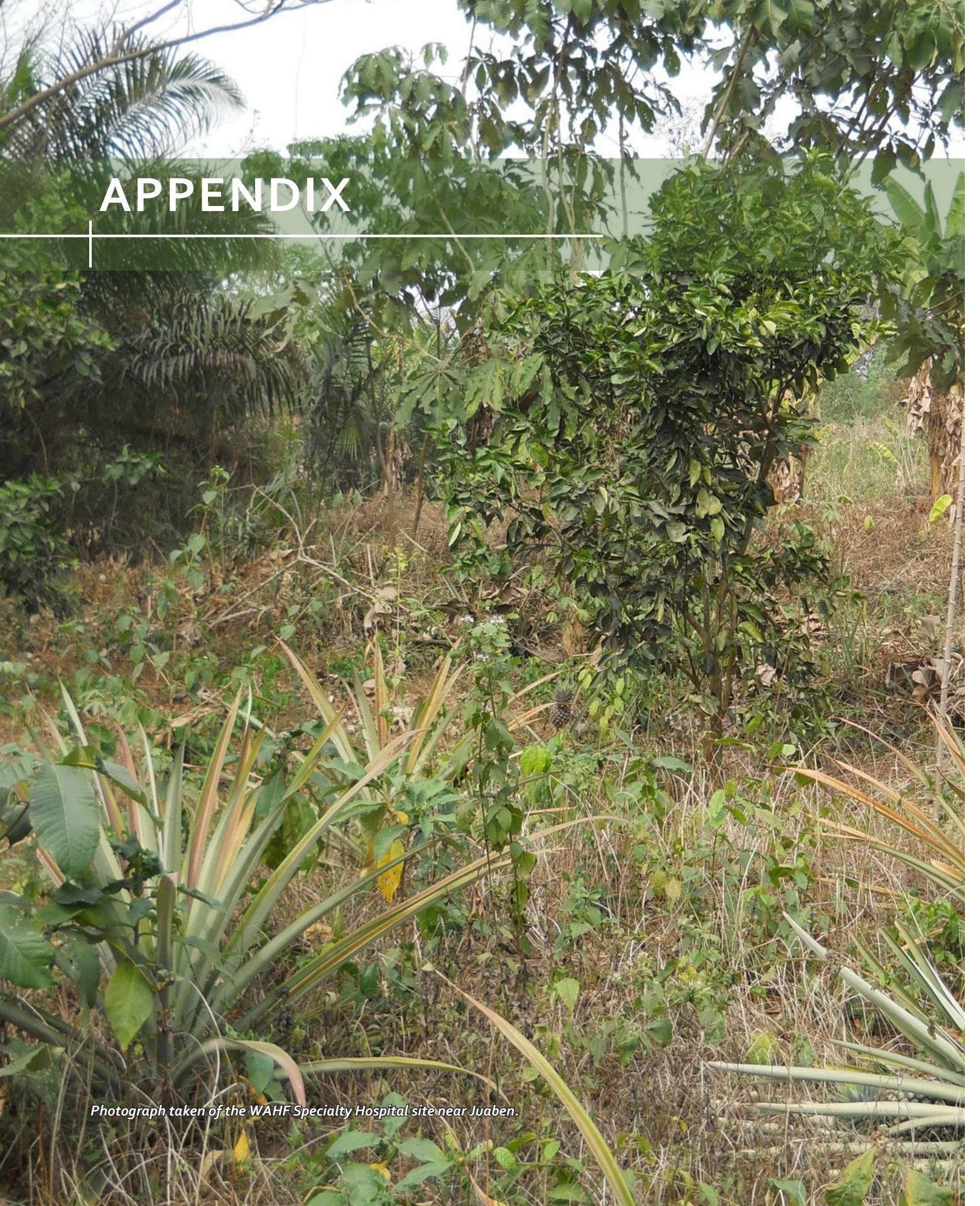
After much collaboration with the West African Health Foundation (WAHF), we hope that this publication provides a basis and structure for designing toward improved health facility typologies in Ghana and the West African region. Through this research, analysis and design, this document identifies the importance of a holistic approach to the health of the people.

This document clarifies an immense need for WAHF's Specialty Hospital within the existing health system of Ghana and within the community of Juaben. Demonstrating the ideas of holistic health in the physical design of the hospital, this publication proves that a hospital can influence beyond its site boundaries and facilitate larger systems of change in the future perception and vision health for Kumasi.

The principles and strategies developed for the city, community, site and building should serve as a basis for future design discussions as WAHF and other collaborators take this project forward. We believe these strategies will help ensure that the success of the project as well as accomplish the Foundation's mission toward global health equity. Through a holistic approach to health, this hospital can become a model for further development in Ghana and Sub-Saharan Africa.

*Authored by Scott Archer, Samarth Das, Vanessa Espaillat and Sagi Golan
Managing Editors, Research Assistants at the Urban Design Lab*

APPENDIX



Photograph taken of the WAHF Specialty Hospital site near Juaben.

PROJECT RESEARCH SOURCES

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