

**ARCHITECTURAL DEVELOPMENT IN HAITI:
A POST OCCUPANCY ANALYSIS**

by

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A THESIS

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This project evaluates and compares three structures in Kenscoff, Haiti through Post Occupancy Evaluations in order to determine the strengths of current building outcomes in Haiti and the areas in need of improvement. With all the organizations and groups that travel to and work in developing countries, various methods of designing and building exist, yet very few of buildings are later evaluated to determine the successes and areas in need of improvement, nor advertised for that matter to share with others how to best design in developing countries like Haiti. This gap in knowledge is the foundation of my research. This study focuses on three buildings constructed on the Chances for Children organization's site in Kenscoff, Haiti. The overarching research question is: How effective are buildings in Haiti at meeting the needs of their users?

This Post Occupancy Evaluation (POE) investigates the social, residential and work spaces at Chances for Children and evaluates their effectiveness in terms of space relative to time and density of people, of quality compared to other buildings in Haiti, and of satisfaction of building users. This study also utilizes formal behavior observation and trace analysis to understand how building occupants use the spaces.

This research does not argue that there is one single solution or best way to design in Haiti or developing countries, but it does analyze and propose improvements to specific aspects identified in the three case studies. The results suggest that the Chances for Children orphanage and guest house building are extremely efficient at meeting the needs of the building users. The only aspect of the orphanage that was unsatisfactory was the kitchen. The only aspect of the Guest House that left guests unsatisfied was the temperature. The quality of spaces, circulation and access, and temperature of the Women's Empowerment spaces were effective at meeting the needs of the buildings' occupants. The only areas participants indicated as unsatisfactory were the comfort based on time spent in the building and comfort relative to density of people in the space. The results of this thesis also indicate aspects that the Medical Clinic staff found unsatisfactory, these aspects being the quality of the building, bathroom, patient rooms, workspaces, and waiting room. The thesis also identified problems related to water leakage, temperature, storage, and vertical circulation.

Overall, this study found that the buildings meet the needs of the guests, the staff, and the children. Outdoor spaces that promote interaction and relationships are provided, as well as degrees of privacy that allow for rest and self-reflection. All building occupants feel safe on the site due to multiple contributing factors, and the overall quality of the buildings is perceptively better than similar building types in Haiti. Chances for Children's built environment was found to be successful and provides good examples and feedback for future building projects in Haiti.

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Introduction

How effective are buildings in Haiti at meeting the needs of their users? How are spaces in these buildings being used? And how can building design improve to support these uses?

This thesis focuses on architectural development in Haiti. The study evaluates the built environment through a Post Occupancy Evaluations, including formal observation, trace analysis and occupant surveys, in order to determine how buildings in Haiti are being used, whether or not buildings meet the needs of their users, and how building design in Haiti can be improved.

Objectives of the Thesis

Haiti is a country struggling to develop due to its history of oppression and ongoing poverty. Since the January 2010 earthquake, a substantial number of NGOs and aid organization have entered Haiti to help aid development efforts, especially regarding the built environment. With all the organizations and groups working to redevelop the country, not to mention Haitians that are rebuilding structures and towns themselves, there are various methods of designing and building that exist.

There is a growing body of literature surrounding architectural development in third world countries, especially regarding outside involvement (e.g. a first world organization building in a third world country). However, much of this information glorifies and commends the projects upon completion. Very few are actually returned to later to evaluate the success of the project or the effectiveness of design methods. Nor,

for that matter, are projects advertised to share with others how to best design and build for that area.

This thesis addresses that issue by analyzing a series of buildings in Haiti with the hope of revealing the positive and negative outcomes of recent building development, and furthermore, to aid future architectural design projects in Haiti. While this research will not argue that there is one single solution or best way to design and build in Haiti (or any other developing countries), it will analyze and propose improvements to current methods.

Introduction to Post Occupancy Evaluations

The primary method of research in this thesis is a post-occupancy evaluation of quality and effectiveness of three buildings on the Chances for Children site in Kenscoff, Haiti. The post-occupancy evaluation was conducted to evaluate how effective the buildings are at meeting the needs of their users and to extract lessons from the successful and unsuccessful aspects that be applied to future projects in Haiti and developing countries elsewhere.

Post-occupancy evaluations (POEs) involve an organized evaluation of opinions about a building from the perspective of the people who use them. POEs assess how well buildings meet the needs of those users and identifies ways to improve building design, performance, and function (Watson).

Typical evaluations involve interviews with focus groups and/or individuals or written questionnaires. The POE developed for this study centers on functional performance, i.e. how well the buildings support Chances for Children's goals and aspirations, and how well the user needs are supported (Alastair).

Introduction to Inquiry by Design

The methods proposed in *Inquiry by Design*, a book written by John Zeisel, provides a framework for the Post Occupancy Evaluation conducted in this study. This framework is based on Environment-Behavior research, and it describes how to observe people, their settings, and the relationship between the two. This particular study utilizes methods of observing physical traces, observing behavior, standardized questionnaires, and focused interviews.

Observing physical traces means systematically looking at a physical environment to find reflections of previous activity. These can be things unconsciously left behind, like paths across a field, or conscious changes people have made in their surroundings like hanging a curtain or building a wall.

“From these traces, one can infer how an environment got to be the way it is, what decision designers and builders made about the place, how people actually use it, and generally how that particular environment meets the needs of its users. Researchers also begin to form an idea of what people are like who use that place – their culture, affiliations, and the way they present themselves” (Zeisel 1995, p.89).

Observing Environmental Behavior means systematically watching people use their environments as individuals, pairs, and groups. Observers ask questions like what do the people do, how do their activities relate to one another spatially, and how do spatial relations affect the people? Observers also look at how a physical environment supports or interferes with behaviors taking place within it. Observing behavior produces data about regularities of behavior, about expected uses, new uses, and misuses of place, and about behavioral opportunities and constraints that environments

provide (Zeisel 1995). These two methods are used in conjunction with standard questionnaires and interviews.

Organization of the Thesis

The thesis is organized into three parts. The first part, chapters 1-2, give the context of this study, providing background information on Haiti and Chances for Children. Chapter 3 describes the problem and my research methodology. The third part, chapters 4-6, reveals the results of this study, conclusions drawn from the results, and recommendations for future research in this area.

Summary of Conclusions

The results of this thesis suggest that the Chances for Children orphanage building, guest house building, and women's empowerment spaces are effective at meeting the needs of the buildings' occupants. The buildings meet the needs of the guests, the staff, and the children.

Outdoor spaces that promote interaction and relationships are provided, as well as degrees of privacy that allow for rest and self-reflection. All building occupants feel safe on the site due to multiple contributing factors, and the overall quality of the buildings is perceptively better than similar building types in Haiti. The thesis also identified problems related to water leakage, temperature, storage, and vertical circulation.

The results of this study also indicate that the medical clinic staff are unsatisfied with the clinic's design, and discloses reasons the occupants feel this way to provide direction for building improvement. Overall though, Chances for Children's built environment was found to be successful and provides good examples and feedback for future building projects in Haiti.

Chapter 1: Haiti

History of Haiti

Haiti is a developing nation in the Caribbean, located just south of Florida. Haiti is the third largest country in the Caribbean behind Cuba and the Dominican Republic, but remains the poorest country in the Americas and one of the poorest in the world with a GDP per capita of US\$ 846 in 2014 (World Bank 2017). The original inhabitants of the island in 1400s called themselves Taino, and named the island Ayiti, meaning “mountainous land.” When Columbus arrived to the island in 1492, he disregarded the Tainos, renamed the island “Hispaniola” (“The Spanish Island”) and claimed it for the Spanish crown. Under Spanish rule, the population suffered from disease and enslavement resulting in a devastating and rapid decrease of the population from 500,000 Tainos to only 600 in 1531. The Spanish then forcibly brought thousands of African slaves to the island to resupply the labor force. In 1697, the French gained control of the western third of the island, and added to the racism and inequality (McKenna 2011).

In the 19th century, however, Haiti became the first in the Americas to permanently abolish slavery and win independence through a slave revolt. This threatened all other countries of the Americas who still practiced slavery, leading to the American and French refusal to recognize Haiti’s independence, and impose a series of blockades and embargoes on the young country (McKenna 2011). The remainder of the 19th century, Haitians fought to keep their freedom and incurred massive debt. Haiti first received international financial aid in the 1953 when the country joined the World

Bank, and “in 1984 began receiving loans from the International Monetary Fund. Since mid-1900s, up to 85% of Haiti’s annual budget has been funded through international aid and loans” (McKenna 2011).

The 20th century, dictatorship led to an exile of Haiti’s educated and middle-class citizens. This situation remains today: “over 80% of Haiti’s educated labor force now lives abroad – the highest percentage in the world” (McKenna 2011). The dictatorship continued until a Haitian social and political movement in the late 20th century ended the regime in 1986. Haiti did not hold a democratic election for another four years. Even when an election finally took place in 1990, the elected president only sat in office seven months before Haiti’s military and economic elite removed him from power. Since then, the government in Haiti remains unstable. Haiti remains the poorest country in the Western Hemisphere, and the most economically unequal. “Three quarters live on less than \$2 per day. Five percent owns 75% of the country’s arable land. Less than 2% of Haiti’s forests are still standing” (McKenna 2011). These conditions of instability, poverty, and inequality were present prior to the 2010 earthquake. These, alongside bad weather conditions, sharp rises in food and fuel prices, and a major decline in international trade due to global recession made it difficult for Haitians to find the means to sustain themselves (ACSA 2014).

When the 7.0 magnitude earthquake hit on January 12th, 2010, it caused a record number of deaths, injuries and displacements, as well as tremendous physical damage to local infrastructure (ACSA 2014). The official toll is 316,000, with a comparative number of people injured, and 1.5 million people left homeless (McKenna 2011). The destruction of infrastructure is also drastic. Over 300,000 homes were

damaged or destroyed by the earthquake, as well as most educational institutions, hospitals, and health centers. This includes the port, Parliament, law courts, and most ministerial and public administrations buildings (McKenna 2011). Even the Presidential Palace, the one building professors of engineering thought would survive an earthquake, lies in ruins (Joyce 2010). The Haitian government released an Action Plan after the earthquake in the hope of moving from crisis to recovery. But this requires safe, permanent housing, functional roads, electricity, water and other services. The challenge to get to this place remains substantial.

Circumstances in Haiti remain difficult and often unhealthy. Many groups and government agencies have put effort towards development in Haiti, but Haiti faces increasing challenges to generating growth and fighting poverty. Reconstruction needs and resource mobilization continue to be a challenge with internal revenues only reaching 13 percent of GDP. In addition, “the depreciation of the gourde against the dollar continues to depreciate,” and “Haiti remains the poorest country in the Americas and one of the poorest in the world with significant needs in basic services” (Chen 2010, p1577). Many impoverished people still live in tent cities. Open sewers and water drains continue to spread disease. Many houses that are still standing show “structural instability with missing walls, caved-in roofs and ladders to take individuals to upper floors. Even buildings previously thought sturdy in the capital are now in ruin, several important cathedrals and the presidential palace among them (ACSA 2014).

Building and Construction in Haiti

Only a month after the earthquake in Haiti, Chile experienced an 8.8 magnitude earthquake of its own that claimed 523 lives. “The comparative math from these two

events is staggering: Chile's earthquake was 60 times more powerful than Haiti's, yet Haiti suffered 500 times more deaths" (Fallon 2015). Haiti's poor building construction is to blame. Haiti has a long tradition of concrete construction, which supports direct pressure well, but is very weak if pulled or shaken, which is exactly what the earthquake took advantage of. "Concrete requires steel reinforcing to withstand forces from all directions, but steel is expensive, and building codes are nonexistent in Haiti" (Fallon 2015).

Pierre Fouche, an earthquake engineer in Haiti – the only one in the country, to his knowledge – says, "Many people are doing whatever they want; they can build whatever they want." He says the biggest problem is that the country does not have a building code (Joyce 2010). Fouche also said that people with money can build reinforced concrete buildings with steel to strengthen the structure, but even this may not meet the engineering standards needed to support a load vertically, and definitely cannot withstand lateral forces of an earthquake. Buildings that most people live and work in are made of unreinforced brick, cement block or concrete. Earthquakes put enormous stress on rigid buildings. In addition, structures are also built on slopes that are prone to landslides (due to fragile, eroded, rain-soaked soils), and without proper foundations or containment structures (Watkins 2010). Entire neighborhoods collapsed because Port-au-Prince was built on all these hills, with the improper foundations, and shoddy construction. "Where you had three or four streets, and houses that were two or three stories high, the top part of the hill collapsed and slid down, and it all landed at the bottom: piles of rubble and people" (McKenna 2011).

Much of the poor-quality work can be traced to the grinding poverty pervasive in Haiti. An earthquake-resistant building costs “10-20% more to build than an unsound structure. For the millions of Haitians living on less than \$2 a day, these added costs make safe construction an unaffordable luxury (McKenna 2011). Additionally, contractors and builders often try to reduce the cost of construction by using readily available materials like limestone dust and unrefined sand, which produce weaker concrete.

Paul Fallon, an American architect who started living half-years in Haiti to help with building design and construction after the earthquake, reported the difficulties and cost of construction for his two projects. Construction machinery is hard to come by, so the team built their own concrete plant to cast blocks where they mixed their own concrete by hand. Fallon said the concrete floor slabs that “might take eight guys and a line of ready-mix trucks six hours to pour in Boston, required 200 men working 40 hours straight, day and night” (Fallon 2015). The labor was cheap (\$6 a day), but the materials were expensive and the machinery was hard to come by. The hope was for Fallon’s two projects to act as prototypes that mirrored Haiti’s vernacular while withstanding earthquakes, but it is too expensive to become a new standard. Before 2010, buildings in Haiti cost about \$25 per square foot. Post-earthquake inflation doubled that price. Then engineering the building cost even more at \$75 per square foot. Fallon noted that this seems cheap compared to US construction,

“but Haitians struggling to feed, clothe and educate their children cannot justify buying sturdy two-dollar block from our factory when they can mix sand and gravel with a handful of cement and a bucket of water to form sun-dried units at

half the cost. These inferior blocks crumble under the slightest pressure, but the distant rumble of tomorrow's earthquakes can't be heard over today's growling stomachs." (Fallon 2015)

Many agree Haiti needs building codes to improve the built environment, but these codes would require higher standards of construction methods and materials that cost much more than current building construction processes, and thus, much more than 80% of Haitians can afford.

The high cost of construction also means that the many Haitians left homeless after the quake are unlikely to rebuild, let alone rebuild to a higher standard for future resilience. Many of the Haitians left homeless after the quake either found shelter in makeshift camps built by humanitarian agencies, and approximately one-third of those who lost homes found shelter with relatives and friends in less affected areas. In addition, "thousands of citizens began building their own shelters in the days following the quake, using materials from collapsed buildings and surrounding areas" (McKenna 2011). Many of these citizens remain in these "new" shelters or the temporary displacement camps today due to the unaffordable cost of building a new, structurally sound shelter, as well as ongoing land-ownership problems in the country and the reluctance of people to leave their homes, possessions and social networks. Hossam Elsharkawi of the International Federation of Red Cross says, "People want to stay where they consider home is. It's a natural human instinct" (McKenna 2011).

Chapter 2: Chances for Children

Amidst all this building and construction chaos, NGOs like Chances for Children, seek to provide homes for children in Haiti and jobs that allow mothers and fathers to care and provide for their families. Chances for Children's vision is to provide hope to Haiti's children by developing leaders and empowering church communities. Chances accomplishes this mission in a variety of ways: adoption/orphan Care, feeding programs, community development, medical care, and women's empowerment programs.

There are over 400,000 children in Haiti living outside of parental care. The cause of this is the family's inability to feed or care for the children due to severe poverty and lack of employment. These children often end up living in the streets of Haiti, working as child slaves (restaveks) or warehoused in orphanages. The United Nations lists over 500 orphanages in Haiti, and most receive very little funding for the children they house. The government is unable to provide funding for these children and without private support these children face a very bleak future. Chances works to keep children with their families by providing jobs for mothers and fathers in Haiti. But in dire situations – such as death, severe malnutrition, or illness, children are admitted into the Creche (orphanage) in Kenscoff. Chances has been processing adoptions for 11 years, has seen over 130 children placed into homes in the US and Canada, and is currently home to approximately 40 children in various stages of the adoption process.

Chances for Children also has a pediatric Medical clinic that opened in June of 2014 at Chances primary location in Kenscoff. The clinic has seen thousands of patients

since that time and has almost 2000 patients on file. The clinic has 2 physicians, 3 nurses, 2 receptionists, 2 lab technicians, and a clinic manager.

The women's empowerment programs provide skill development and employment to help keep families together. The first program began in a tent directly following the devastating 2010 earthquake, and has since launched into a brand of hand-crafted, Haitian made jewelry and accessories known as Ila Joi (pronounced "eela jawah"). The second program, called Zel Haiti, began just two short years ago on the Chances for Children site in Kenscoff. The women employed by Zel make medical scrubs to sell. Zel also has a skills development program that brings mothers in from the community and teaches them to sew so they can make and sell their own products at local markets. Both the women's empowerment programs provide a sustainable income that allows women to provide for their families.

Chances also partners with church missions' teams, many of whom bring specific skill sets needed for on-site projects. These teams stay in the on-site guest house.

The Site

Three buildings, a guesthouse, a medical clinic with women's empowerment offices attached upstairs, and an orphanage, are located directly on site and together contain all the programs expanded upon above. The participants in these programs make up the user groups for this study. This site was chosen because it provides an adequate and reasonable number of buildings and range of building types for this study. Each of the buildings on site were constructed after the 2010 earthquake, utilizing donated funds from organizations and individuals sponsoring Chances for Children and its programs.

Additionally, this site was chosen because I visited the site twice prior to beginning this research and established relationships that aided in the planning and execution of my research.

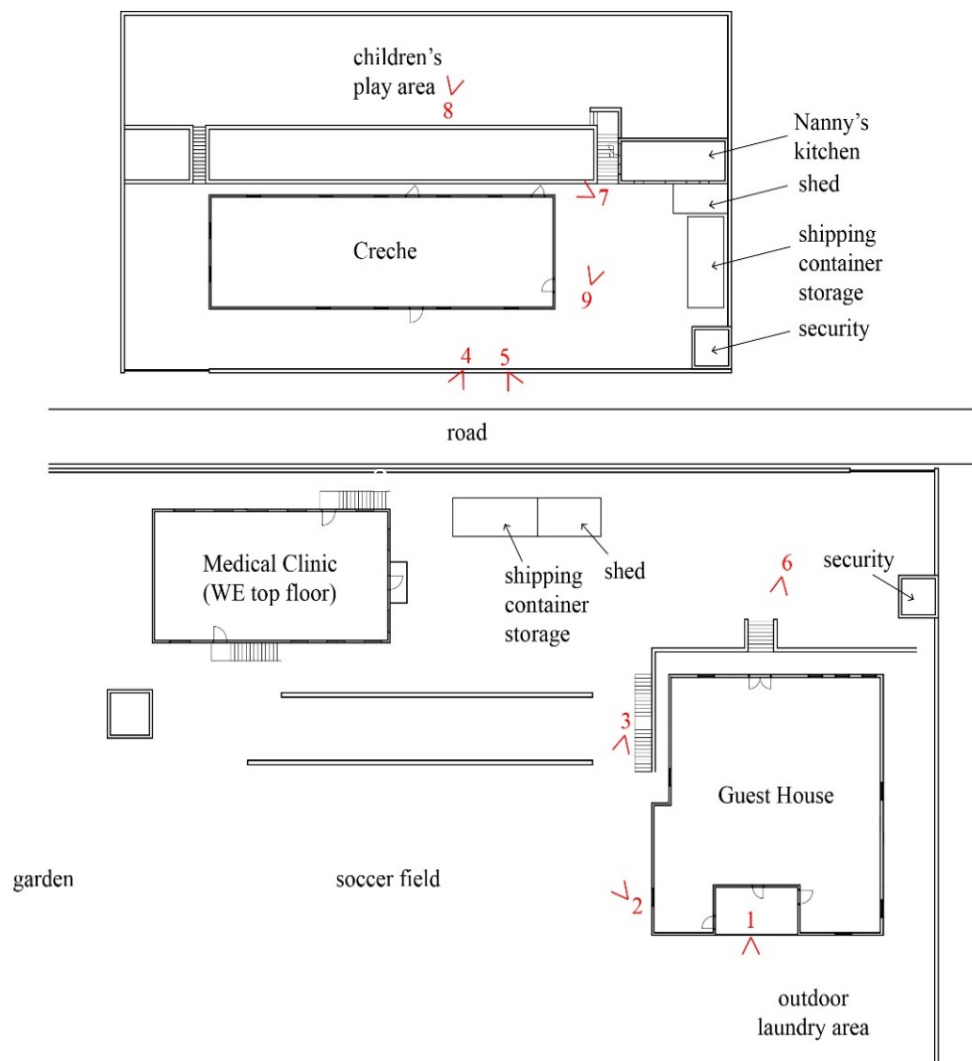


Figure 1: Chances for Children Diagrammatic Site Plan. Locations of site photos are numbered.

Figure 2: Site Photos. See Figure 1 for locations and directions photos were taken.



Figure 3: Summary Table of Building Dates and Construction

Building	Year Built	Building Designers	Builders
Orphanage	2013	Steel SIP Systems Phillip Bennett Architect	*Local builders *Volunteers from abroad
Medical Clinic / WE	2012	Rome Ventura of Lake Union Rowing Outreach Foundation	Rome Ventura of lake Union Rowing Outreach Foundation Week by week volunteers from abroad
Guest House	<2012	Pastor Maxime	*Local builders *volunteers from abroad



The Buildings

The Medical Clinic has the most information about the building design and construction process. The Orphanage has relatively little information. There is no information on the Guest House besides the person in charge of the project. This section outlines the information known about each building.

The Medical Clinic

The medical clinic was built by Rome Ventura of Lake Union Crew (LUC) Outreach Foundation. The foundation team raised money through fundraisers, then donated and built the exterior. The Chances for Children team did the interior. The LUC Outreach Foundation team spent ten weeks in Haiti to build the medical clinic. Members of the LUC team came in waves over the ten-week period and worked alongside Haitians, utilizing a translator and working through Rena, the local crew leader. The clinic is made of steel columns and roof trusses with an earthquake rated foundation, concrete floors, and thousands of extra screws to meet the 150 mph hurricane requirements. There is some foil backed bubble insulation in the roof, but doesn't appear to be any insulation in the walls. The stairs and balcony are made of aluminum. Behind the building, the team dug and built a septic tank, with 200 feet of water piping that withstood the 24-hour water test before capping it. The rain water collection tank holds 1,000 gallons. There are no bathrooms, just secured portapotties. After 10 weeks, the team left a 3,600 square foot, 2 story, hurricane and earthquake reinforced building; a 4 stall septic system with drain field; a chicken coop for 300 free range layers; a rainwater retention system; a water pump, tower and tank with 250 feet

of buried piping and a playground. The whole process was recorded on the LUC blog, a link to which is provided in the Accompanying Materials section of this document.

The Orphanage

The Orphanage was built with the support of Steel SIP Systems and Phillip Bennett from Phillip Bennett Architecture, Design, and Planning. Steel SIP Systems is a company dedicated to the use of these systems in residential and commercial construction. They provide insulated panels and components, as well as consulting, training and other builder support services. The Structural Insulated Panels (SIPs) are high-performance engineered panels that work for walls, roofs, and even floors in residential and commercial buildings. The most common SIPs are made from a dense core of expanded polystyrene (EPS) foam insulation between two structural skins of either steel or oriented strand board (OSB). This results in a solid one-piece component that provides structural framing, insulation, and exterior sheathing. Each finished panel is approximately 4' wide, light and easy to handle, and interlocks with adjacent panels.

Steel SIPs Systems puts each panel through extensive and rigid testing to ensure they continue to meet and exceed building code requirements for wind, live and dead loads, racking, and impact. Hurricane tests on the system have proven them to be stronger than block or wood frame construction, withstanding winds exceeding 140 mph with only minor siding damage and no structural failures. These panels result in strong, energy efficient, and cost-effective building systems. More information on Steel SIPs Systems can be found on their website, a link to which can be found in the Accompanying Materials section of this document. The construction drawings for the

Orphanage were finished in March of 2013 and can be found in the Appendix of this document.

The Guest House

Very minimal information exists for the design and construction of the Guest House, except that it was built between February 2010-May 2012 by Bishop Renelus Maxime, Chances for Children's General Manager, and a local pastor in Kenscoff.

Chapter 3: Research Methods

Given the state of Haiti and the ongoing involvement of NGOs in Haiti's development, the question becomes: *How can the built environment improve?* And to know this, the questions must be asked: *How is the built environment being used? And how are the needs of building users being or not being met?*

This study uses a standard western practice for evaluating architecture (aforementioned in the Introduction) called Post-Occupancy Evaluation (POE) to investigate these questions. A POE systematically evaluates the opinions about buildings from the building users themselves. It assesses how well buildings match users' needs, and identifies ways to improve building design, performance, and fitness for purpose (Preiser 2016). To perform this evaluation, researchers often interview individuals or focus groups representing employees and other stakeholders. These groups or individuals are prompted to make testable observations about the buildings' effects on productivity and well-being. These observations are then documented to form the basis of recommendations.

This specific study provided surveys to both individuals and groups during a specific data collection period. Each survey was given to the participant in the building being observed so that direct observations could be made on site. Due to language barriers, written questionnaires in the native Haitian language of Creole were developed to be used by native speakers. I administered the surveys with the help of an on-site translator, who aided in situations where participants are unable to complete the survey on their own due to literacy issues. The translator signed a waiver prior to administering any questionnaires indicating his/her understanding of participant privacy, and is held to

a strict no sharing policy. Individuals who speak English and chose to fill out an identical questionnaire in the English language were able to do so.

Data was collected on typed and printed questionnaires. All questionnaires were conducted on the Chances for Children site in Kenscoff. Participants filled out questionnaires by hand. Any individuals who was unable to fill out the questionnaire themselves due to literacy limitations, but was willing to participate in the survey orally, was given assistance from the translator. It took each participant 15-30 minutes to complete the questionnaire. Each participant engaged in only one questionnaire session. Photographs of the buildings' exterior and interior spaces were also documented, but no participants are included in these photographs due to restrictions made by the Institutional Review Board (IRB).

The screening procedure took place at the start of each questionnaire. Each questionnaire begins by ensuring the participant is above 18 years of age. The participant then checked a box identifying which building user they were, i.e. staff, visitor, etc. If the participant was under the age of 18 and/or does not fall into one of these categories, he or she was not eligible to participate in the study.

The elements of consent were both verbal and written. The written consent document was written at a fifth-grade reading level to address unpredictable literacy levels. Both the verbal script and written consent form described to participants their involvement in the research and encourage participants to ask questions before signing or verbally offering consent. The translator was present for each of the questionnaires administered to help answer questions about the research and process. Each participant

then signed the written consent form prior to participating in the survey. A total of thirty-six building users participated in the study.

Identifying patterns was the primary method of analyzing the questionnaire data. Answers to the questionnaire questions were input into a single document, and then organized to reveal patterns. The graphs and tables shown in Chapter 5 below show the results of this data. Answers that fall into unsatisfactory categories reveal which areas the buildings fail to meet the needs of their users. Answers that fall into satisfactory categories reveal which areas the building succeeds in meeting the needs of their users. Together, these patterns reveal successful aspects that should be repeated in the future and less successful aspects of the building that can be improved and accounted for in future design.

I also conducted formal behavior observations and analyzed physical traces as part of the evaluation. Behavior observations and physical trace analysis is outlined in John Zeisel's book *Inquiry by Design*. The observations and traces do not require any of the building users' participation, and were determined noninvasive by the IRB. Individuals from missions' teams frequently walk around the site and tour the various rooms and buildings, so for me to wander the site and take photographs of the building is not out of the ordinary. The observations utilized an Observation Evaluation Sheet, which can be found in the Appendix at the end of this document. Notes about behavior and the spaces these behaviors took place in were recorded on the Observation Evaluation Sheet. Once all evaluations were finished and traces were found, the data was analyzed for patterns in the users' behaviors and summarized in the diagrams shown in Chapter 4 of this document. Behavior observations and documentation of

physical traces were conducted during the time of December 12th through December 19th, 2017. The following chapters outline the results of this investigation.

Limitations and Influences in the Evaluation

A huge limitation and influence in the evaluation is language and literacy. Though the survey was offered to participants in both English and Creole, the way the Creole translation may not have been as clear in meaning and specific in vocabulary for every question in the survey. Additionally, the literacy rate in Haiti is very low. Only 61% of males and 57% of females are considered literate. Additionally, only 29% of Haitians 25 and above attended secondary school (Badger 2018). Thus, though roughly 60% of Haitians are considered literate, it may be at a primary literacy level. This would affect participant understanding.

Another influence in the survey is focus groups versus individual interviews. Some participants took the survey in the form of an individual interview. For these, the participant was guided through the survey by myself and the translator. However, due to time constraints, patient schedules, etc., some of the surveys were taken in focus groups. This is true of the medical clinic, where it was easier for the staff to take the survey together during their morning meeting rather than interfering with patient schedules throughout the day. It was also true of the women's empowerment program where some women opted to be individually interviewed and others opted to take the interview as part of a group.

Focus groups allow a group of individuals to communicate with each other on a specific topic and oftentimes engage in discussions that lead to clearer and deeper insights (Palermo 2017). Individual interviews allow conversation to be customized to

each participant. One participant may be more knowledgeable or have a stronger opinion in specific topics. Where this voice can sometimes be hindered in focus groups, it is heard in an individual interview. Thus, there are pros and cons to both methods, and both were used for the purposes of this study.

The scale of the project may also limit or influence results. Though most of the medical clinic staff and women from Zel and Ila Joi's programs participated in the survey, fewer staff work in the guest house and only about an eighth of the orphanage staff were interviewed. The number of participants from each building may sway the results. For example, if only three people participate in a survey, each voice holds much greater weight in the results than if one hundred people participated in the survey.

Additionally, the ability to reach all key players limited the results. Every architecture and/or design project is made up of many designers, engineers, contractors, clients, etc. The evaluation could have been pushed further by contacting the designers and builders about their design intentions and methodology. This could have provided a better foundation for evaluating the success of the design intentions behind each building.

Summary of Data Collected in this Evaluation

Building	# of surveys	Physical Traces	Behavior Mapping Observations
Orphanage	4	<ul style="list-style-type: none"> • Adaptations for use, separations: bars on window • By-products of use, erosions: wear and tear on the staircase • By-products of use, erosions: water damage to exterior of building • Displays of self, personalization: walls covered in crafts and photos • By-products of use, missing traces: nothing in kitchen 	<ul style="list-style-type: none"> • Smaller children use upstairs space • Nannies kitchen is outside and upstairs from the rest of the building • The outdoor space is widely used • Kids and staff line the perimeter wall and look out over the road and clinic, or face inward towards things happening in the outdoor courtyard • Kids are often divided by age for activities like eating and sleeping. They also play primarily in these similar age groups • Very few kids spend time upstairs during the day. Mostly just the babies. Everyone else spends time down in the main communal areas. Indoor space is less popular than outdoor space. • There is no formal outdoor seating
Medical Clinic / WE	13 / 12	<ul style="list-style-type: none"> • By-products of use, leftovers: clutter shows lack of storage space • By-products of use, erosion: warping of wall materials • Displays of self, personalization: long benches and fun banners • Adaptations for use, props: metal structure used as display shelves • Adaptations for use, props/connections: table in the hall unutilized • Public messages, unofficial: welcome sign in Zel workroom 	<ul style="list-style-type: none"> • The WE offices rarely have visitors. They are primarily used by the women who work there. • There is only one way in and out, and sometimes this stairway is too narrow for people passing each other going opposite directions • Much space upstairs in unused • There is one bench outside the medical clinic, but this doesn't seem to meet the demand for outdoor seating • Women from the zel and ila joi program work together at large tables. • There aren't many outlets for the women in the walls, so they use extension cords. The places they can put their tables is very limited because of this.
Guest House	8	<ul style="list-style-type: none"> • By-products of use, erosions: appliances • Adaptations for use, props: window frame used as shelf for storage • Public Messages: signs in English written for guests • Adaptations for use, props: nails put in wall and on shelf for storage and personalization • Adaptation for use, separation: window curtains • Public Messages, unofficial; waste chart in the kitchen 	<ul style="list-style-type: none"> • Vertical circulation is steep • Guests frequently congregate in the large communal room • The entryway provides lots of space for social interaction • The lines between public and private seem very clear • The kitchen is a shared space for guests and the staff • There is no formal seating outside

Chapter 4: Inquiry by Design Results

Behavior Mapping

As mentioned in the Introduction, behavior mapping means systematically watching individuals, pairs, and groups of people use their environments. Observers watch what activities people do, how those activities relate to each other spatially, and how those relations affect other participants. The goal is to see how a physical environment supports or interferes with behaviors taking place within it. Observing behavior generates data about what people do; about the relationships needed to sustain those activities; about regularities in behavior; about expected uses, new uses, and

misuses of place; and about behavioral opportunities

and constraints that environments provide. Figure 3

outlines qualities of the research method for

Environmental Behavior studies, different vantage

points that an observer can take, common recording

devices, and an outline of what to observe. An

understanding of qualities of the method keeps

observers aware of potential problems, such as

reporting observations in authentic descriptions, that

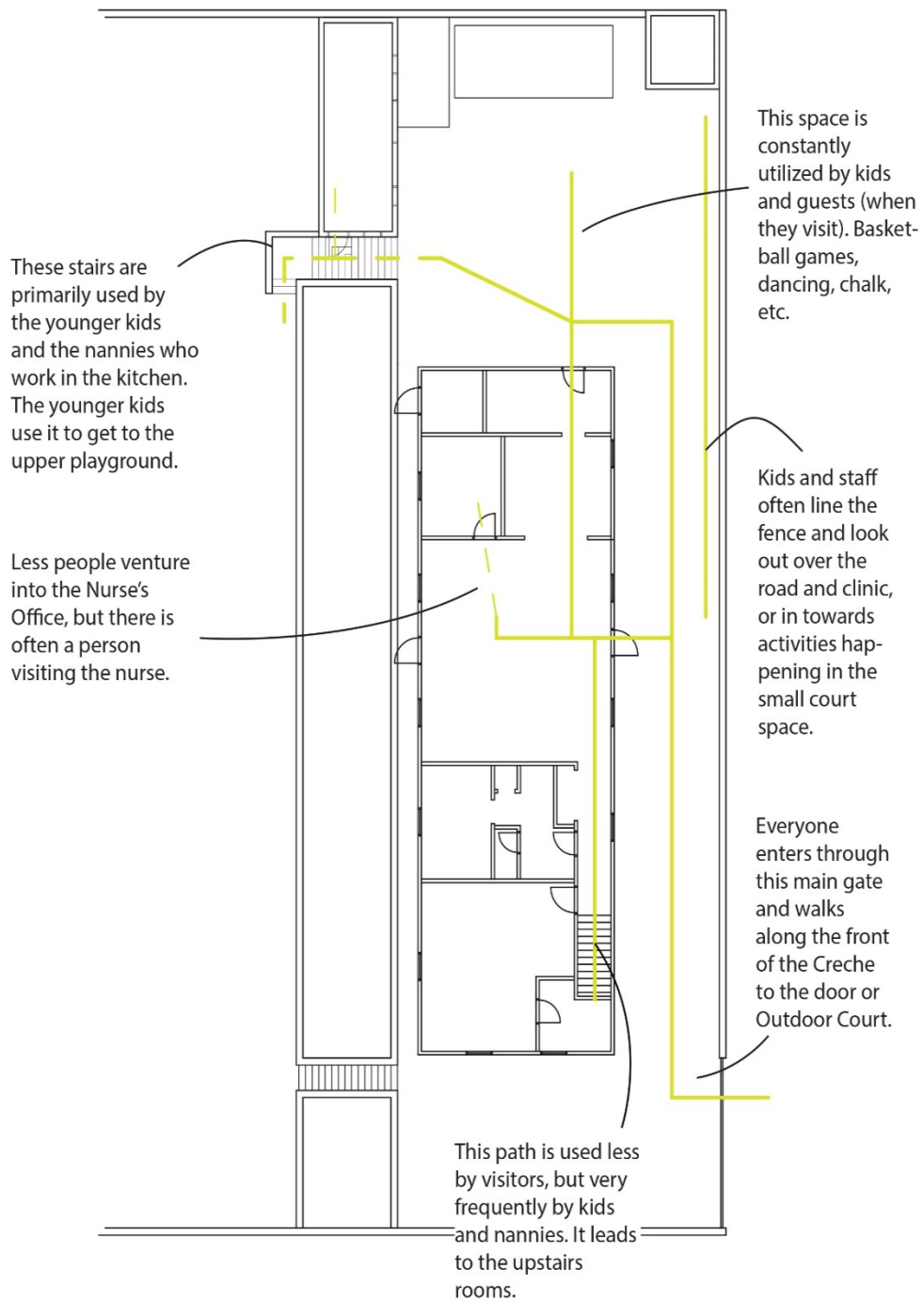
unfortunately omit details and transfer untested

feelings. An awareness of qualities and vantage points

helps standardize observations.

Observing Environmental Behavior
<i>Qualities of the Method</i>
Empathetic
Direct
Dynamic
Variably intrusive
<i>Observers' Vantage Points</i>
Secret outsider
Recognized outsider
Marginal participant
Full participant
<i>Recording Devices</i>
Notation
Precoded checklists
Maps
Photographs
Videotapes and movies
<i>What to Observe</i>
Who: actor
Doing what: act
With whom: significant others
Relationships
Context
Setting

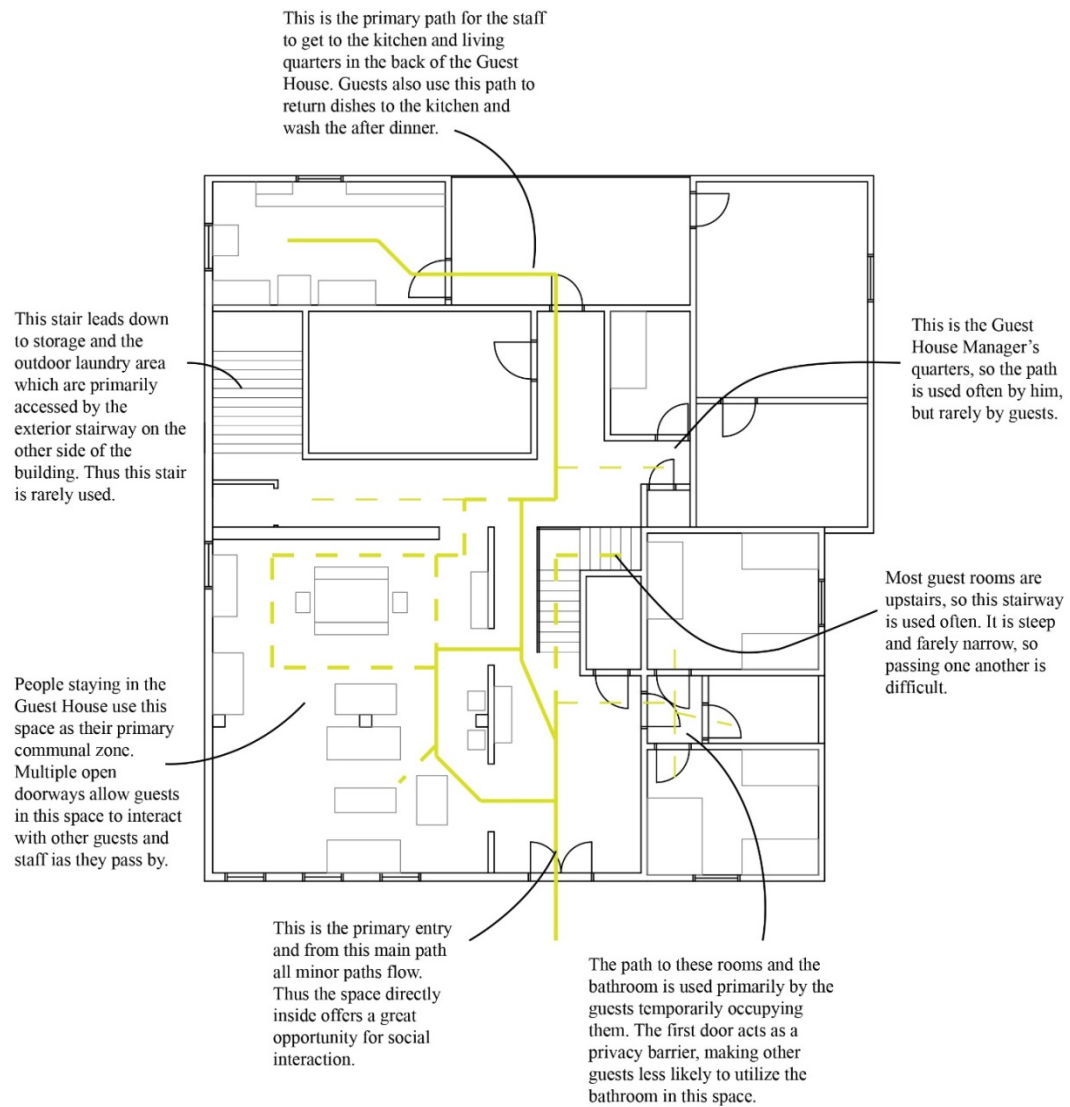
Figure 4: Observing Environmental Behavior, from Ziesel's *Inquiry by Design*.



Circulation

Figure 5: Behavior Mapping: Creche, Circulation

Figure 6: Behavior Mapping: Guest House, Circulation



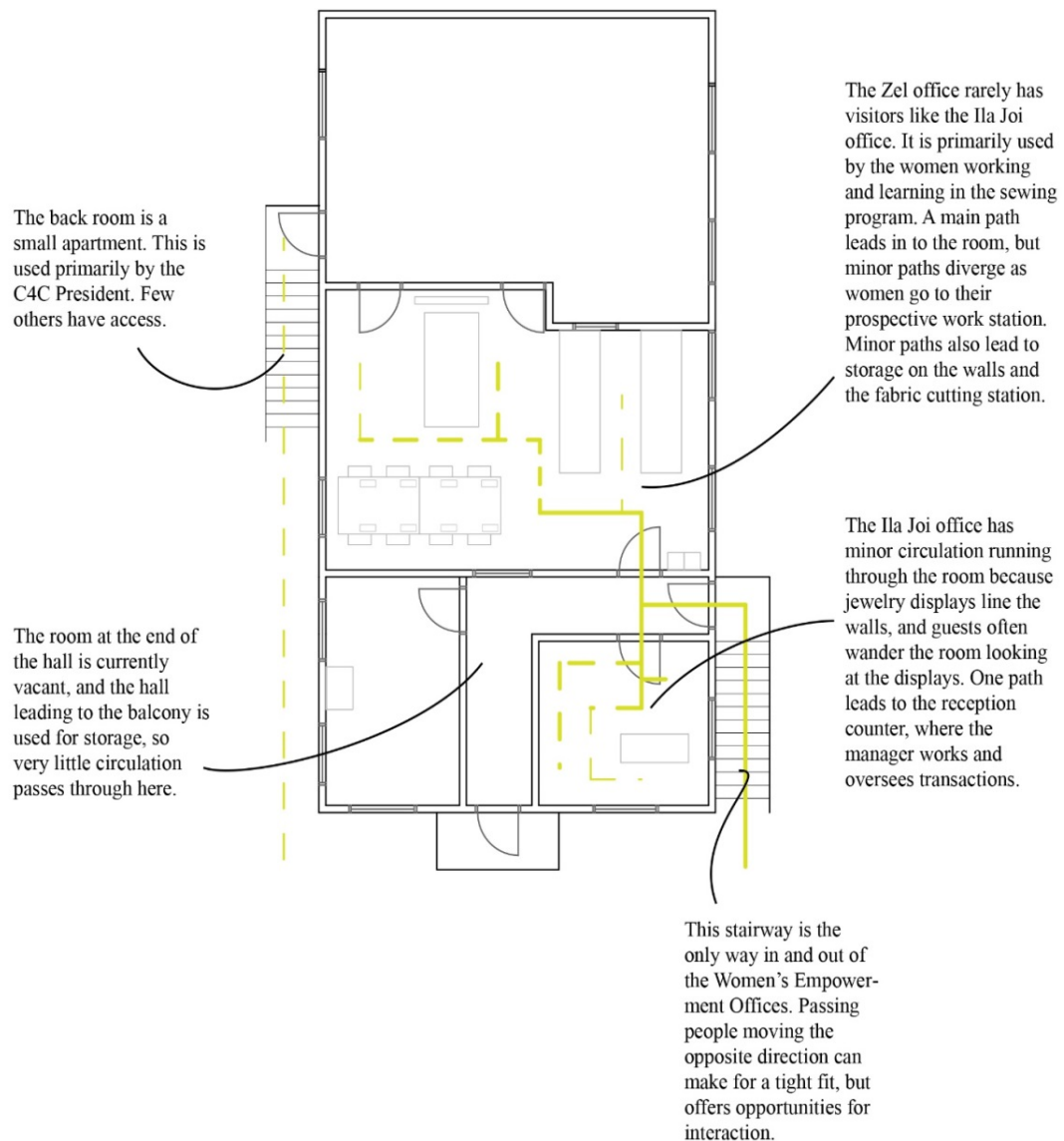
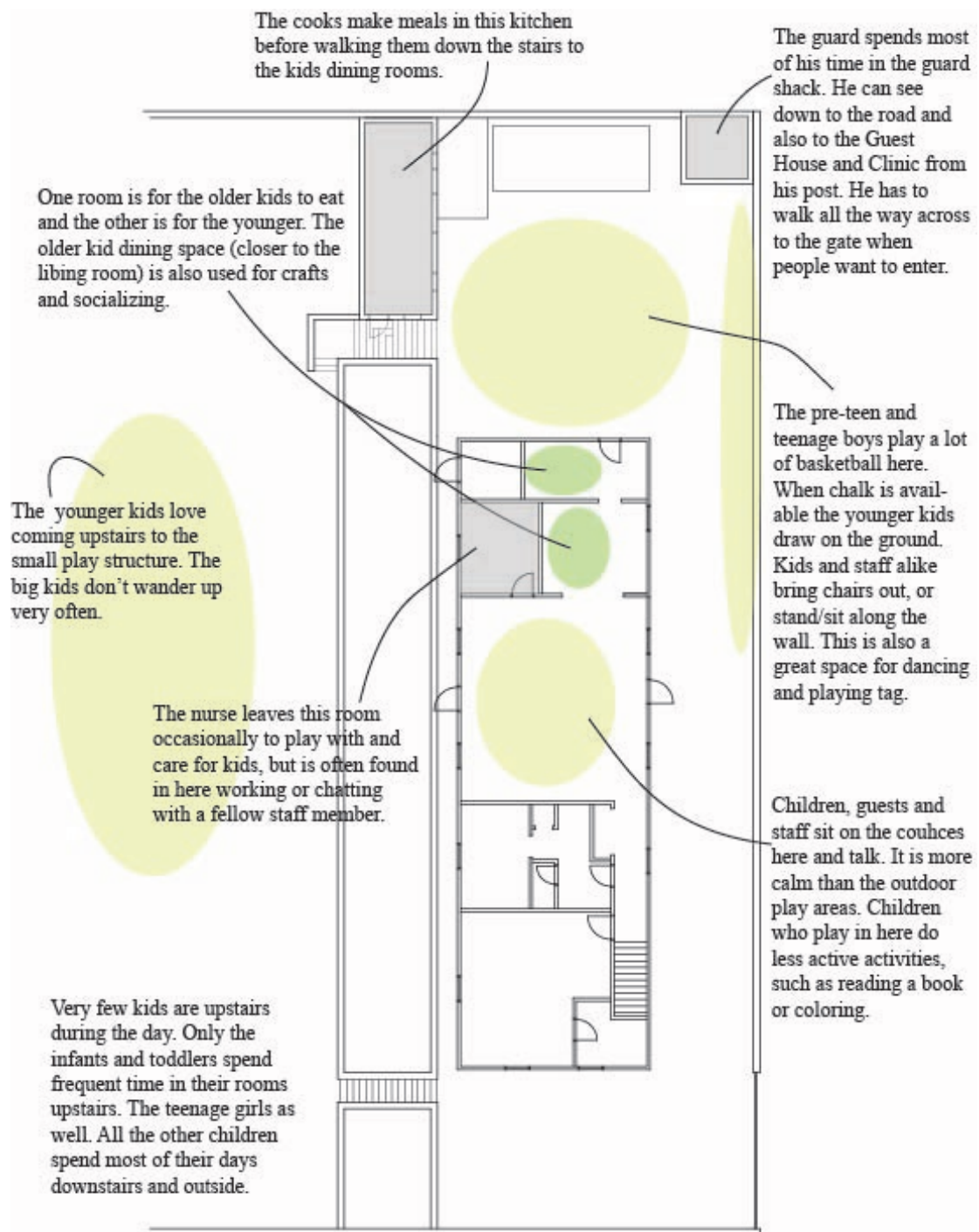


Figure 7: Behavior Mapping: Women's Empowerment Offices, Circulation



Activities Supported

Figure 8: Behavior Mapping: Creche, Activities Supported

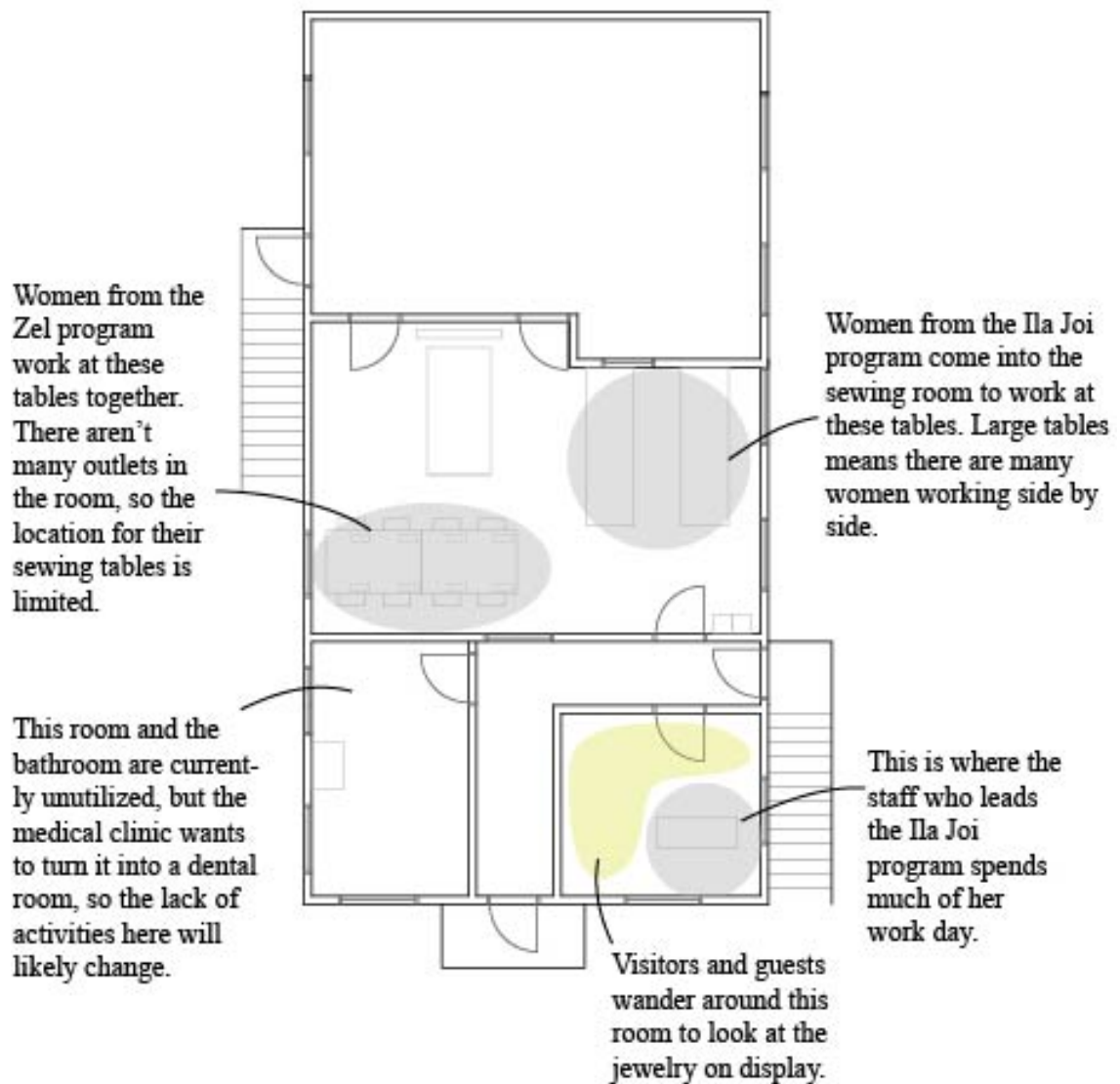


Figure 9: Behavior Mapping: Women's Empowerment Offices, Activities Supported

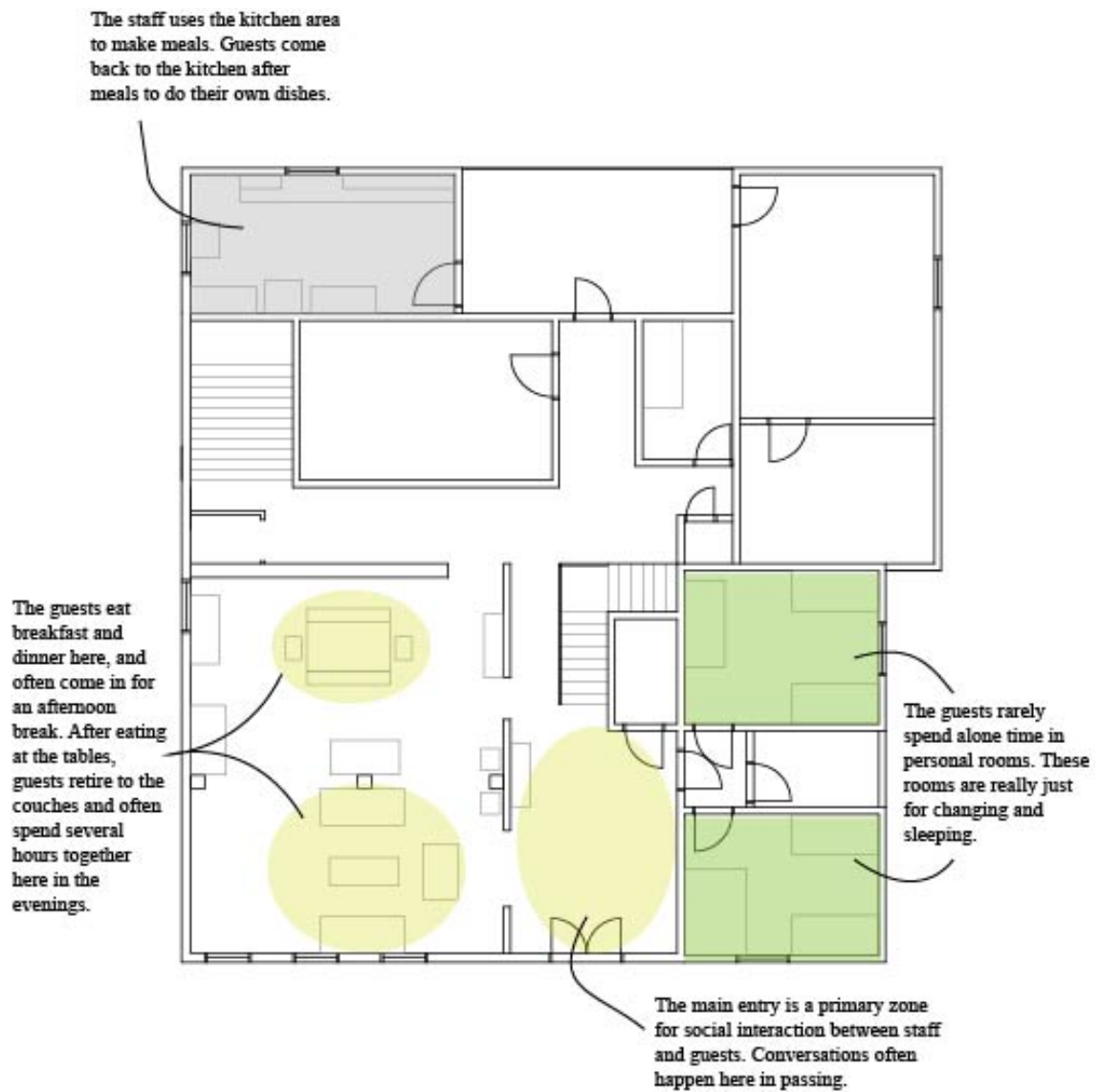


Figure 10: Behavior Mapping: Guest House, Activities Supported

Key Findings

1. Outdoor space is the primary public space.
2. Public and Private areas are well articulated due to barriers like stairways, or vestibule spaces between public spaces and personal rooms.
3. Elevation changes are common inside and outside. These are excessively steep. It is hard to pass people moving in the opposite direction.
4. Although the outdoor space is the primary public space, there is very little seating available outside.
5. The indoor group spaces are also used frequently. These spaces are much quieter and more relaxed than the outdoor spaces.
6. The women working in the Women's Empowerment programs enjoy working close to one another, but seem to be low on space.
7. Although electricity is unreliable, when it is working, there are generally not enough outlets for the power to be useful for the women while they are working. There are short extension cords available, but the location of the women's table is dependent on the limited locations of the outlets in the wall.
8. Personal rooms are rarely utilized during daytime hours.

Physical Traces

Observing physical traces means “systematically looking at physical surroundings to find reflections of previous activity.” Traces can be unconsciously left behind, such as a path across a field, or they may be conscious changes people made in their surroundings, like a curtain hung or a wall built (Zeisel 1995, p.89). Observing physical traces is important because it shows how an environment got to be the way it is, what decisions were made by designers, builders, and users, how people feel about the space, how people use it, and ultimately, how the environment meets the needs of its users.

Observing Physical Traces
<i>Qualities of the Method</i>
Imageable
Unobtrusive
Durable
Easy
<i>Recording Devices</i>
Annotated diagrams
Drawings
Photographs
Counting
<i>What to Look for</i>
By-products of use
Adaptations for use
Displays of self
Public messages
Context

Figure 11: Observing Physical Traces Table, from Zeisel’s *Inquiry by Design*.

Figure 10 presents qualities that make this method significant for E-B research, different ways researchers choose to record traces, and what to look for when observing physical traces. When observing physical traces, it is important to ask questions about what caused the trace, what the intentions are behind it, and what sequences of events may have led to it. It is easy to form hypothesis from these questions, but other methods must be used to confirm these hypotheses. Traces can’t be used alone. But they are relevant when used alongside behavior mapping and questionnaires. Together, these methods provide a database of evidence free of assumptions.

Physical Traces to Look for
<i>By-products of Use</i>
Erosions
Leftovers
Missing traces
<i>Adaptations for Use</i>
Props
Separations
Connections
<i>Displays of Self</i>
Personalization
Identification
Group membership
<i>Public Messages</i>
Official
Unofficial
Illegitimate

Figure 12: Physical Traces to Look for, from Zeisel's *Inquiry by Design*.

Figure 11 breaks down types of physical traces a researcher should look for. The four traces outlined are By-products of use, adaptations for use, displays of self, and public messages. By-products of use reflect what people do *in* settings, whereas the other three reveal what people do *to* settings (Zeisel 1995). By-products of use might be worn spots on a chair that show a frequency of use or a misuse. Adaptations for use show changes people make to their environment for it to be better suited to their uses such as a fence built or wall broken down. Displays of self are changes people make to establish a place as their own such as a flag or personal memento.

Public messages are changes people use to

communicate to a larger public audience, such as wall posters or graffiti (Zeisel 1995). Overall, observing physical traces is a good way to begin or support a research project. It is easy and unobtrusive, and observations can be carried out both qualitatively and quantitatively (Zeisel 1995). It is “aimed at increasing our ability to intervene through design to make settings better suited to what people actually do” (Zeisel 1995, p.110).

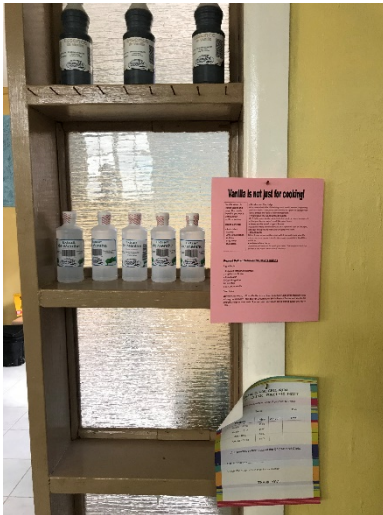
In the pages that follow, a series of physical traces will be shown with a description of the trace and a hypothesis about what this might suggest about the environment, how it is used, and how well or not well the environment is meeting the users' needs.

Physical Traces: Guest House



BY-PRODUCTS OF USE: EROSIONS

Many of the appliances located on site show signs of erosion. General wear and tear is commonly seen on the furniture and appliances throughout the three buildings.



ADAPTATIONS FOR USE: PROPS

AND PUBLIC MESSAGES:

There is almost no built-in storage (such as closets) in any of the buildings. The bottles on the shelf of this interior window, and the nails driven into the wood show that this storage is absolutely taken advantage of and there may be a need for more.



ADAPTATIONS FOR USE: PROPS

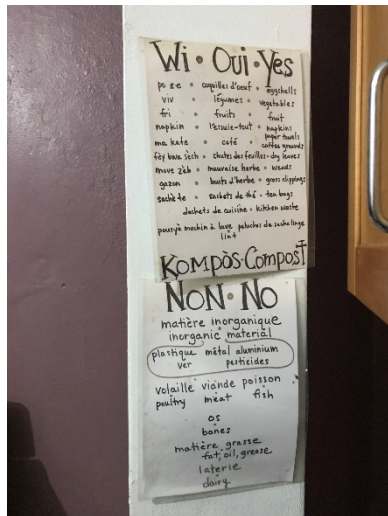
The nails and string in the wall show adaptations the users made to personalize this space or to display public messages.

ADAPTATION FOR USE: SEPARATION

The curtains provide privacy between the interior and exterior. Children, staff, and other visitors often spend time outdoors; this curtain helps the guest rooms maintain



privacy. There is also no exterior shading on the buildings. Though the mountains do have a milder climate, the temperature can still get quite hot in the afternoons. This curtain provides a barrier between the occupants and the sun. It also shows the typically condition of the curtain not being an adequate size for the window.



PUBLIC MESSAGE: UNOFFICIAL

This trace is in the guest house kitchen. It shows how the communication barrier can be broken using public messages in both Creole and English. Also, guests also have little interaction with the women cooking, the women leave after they set out dinner, and it is the guests responsibility to do the dishes and clean up after dinner. This sign helps communicate to guests the expectations for food and waste.

Physical Traces: Orphanage



ADAPTATIONS FOR USE: SEPARATIONS

Many windows in Haiti are barred. This bar is in the kids' room upstairs, and is likely done for safety.



BY-PRODUCTS OF USE: EROSIONS

The stairs in the orphanage already show signs of wear and tear. The tiles are coming up at the end of the tread.



BY PRODUCTS OF USE: EROSIONS

This trace is located on the front elevation of the orphanage. It shows sign of erosion on the building's exterior due to water damage.



DISPLAYS OF SELF: PERSONALIZATION

The orphanage walls are covered in pictures, crafts, and hand-made signs. The children and nannies hang these to personalize the space and create a sense of home, ownership, and belonging.

BY-PRODUCTS OF USE: MISSING TRACES



There is no food or kitchen essentials stored in the cupboards here. And there is little wear and tear seen on the kitchen appliances. This kitchen is not used because a more traditional Haitian kitchen with an open fire stove was built outside.

Physical Traces: Women's Empowerment



BY-PRODUCTS OF USE: LEFTOVERS

This is in the Zel Program's sewing room. The women receive many donations, but there is very little storage in their workroom. This collapsible wire shelf was put in to manage storage needs. The table is also excessively full of women's sewing equipment.



BY-PRODUCTS OF USE: LEFTOVERS

This shelf shows a similar condition as the last trace.

The many donations given to the program and the supplies necessary for daily work are stored on shelves around the exterior wall of the room.



BY-PRODUCTS OF USE: EROSION

The warping of these walls shows the poor material choice for Haiti's humid climate and varying temperature.



DISPLAYS OF SELF: PERSONALIZATION

The long benches provide seating for the women in the program, but have a hard surface for extended periods of time, and are difficult to get in and out of when women need to get up to cut material. This photo also shows fun banners hung to decorate the space.



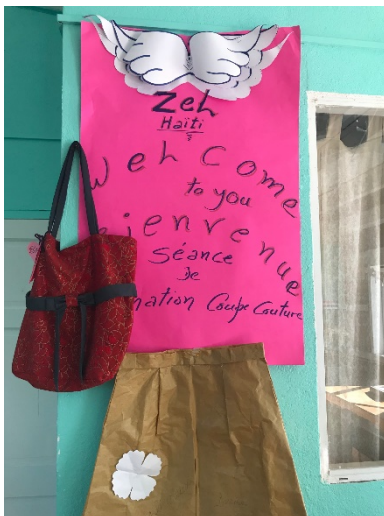
ADAPTATIONS FOR USE: PROPS

The women use the metal wall structure as shelves for storing their supplies as well as displaying their merchandise.



ADAPTATIONS FOR USE: PROPS/CONNECTIONS

This table is in the hallway adjacent to the Ila Joi and Zel workrooms. The team present on site while I conducted my research were asked to build a bench in this hallway to meet the growing space demand for the Zel program.



PUBLIC MESSAGES: OFFICIAL

This sign is posted inside the Zel workroom. It is in Creole, clearly directed towards Haitians. Whereas the Ila Joi program is more neatly arranged with formal signage directed towards buyers, the Zel program is more directed towards the staff working.

Key Findings

1. There is a general need for built in storage or more sturdy storage solutions.
2. Personalizing spaces through public messages and displays of self is common.
3. The wood furniture looks uncomfortable for long periods of seated work.
4. The eroding of wall materials shows incompatibility between the materials chosen and the climate conditions of the region. The water damage on the exterior of the orphanage may reveal there are deeper moisture related issues, and that these issues are common.

Chapter 5: Questionnaire Results

The post-occupancy evaluation (POE) was conducted to evaluate how effective the buildings are at meeting the needs of their users and to extract lessons from the successes and shortcomings. This POE centers on functional performance and space quality. Space quality surveys are conducted with the overall goal of refining and improving design process. The information gained from this survey may be used for design modifications to the Chances for Children campus and when designing new spaces in Haiti.

Survey Method

The POE survey was conducted from December 14th to December 18th on the Chances for Children site in Kenscoff, Haiti. The survey was intended for people familiar with the Chances for Children site, which includes guest house nannies, women's empowerment staff, medical clinic staff, and guest house staff and guests.

The survey was administered on paper and was estimated to take 15-30 minutes. Five survey types were created: Guest House Staff, Guest House Guest, Medical Clinic Staff, Women's Empowerment Program, and Orphanage. There is very little difference between the five surveys, except the terminology used in order to maintain relevance to the participant. Each survey was available in English and in Creole. Participants chose in which language they would like the survey administered. The surveys contained a total of 30 to 38 questions depending on the survey type. Most surveys were administered to individuals, except for the Medical Clinic Staff and some of the Women's Empowerment who opted to take the surveys in groups for convenience.

Participant Population

The participant population includes the Chances for Children site and organization managers and the building users (staff, visitors, guests, etc.). Although children live on site, no children were allowed to participate in this study due to limited understanding of questionnaire content and the additional IRB requirements for children. This population was chosen because it can best say whether or not the building performs as intended and whether or not users’ needs are met. Native Haitians also have a better understanding of how these buildings relate to surrounding buildings in the area, and how appropriate the buildings are culturally and physically to the site. No one will know the answers to these questions better than those who were involved in the building project process and those who use the building currently.

Eleven percent (11%) of those who responded were orphanage staff, 31% medical staff, 17% guests, 5% guest house staff, and 36% from women’s empowerment programs. Sixty-nine percent (69%) of participants were female, and 31% were male. Only 26% of participants were present when the building they work in was built, and surprisingly 43% of those present participated in the design or construction process.

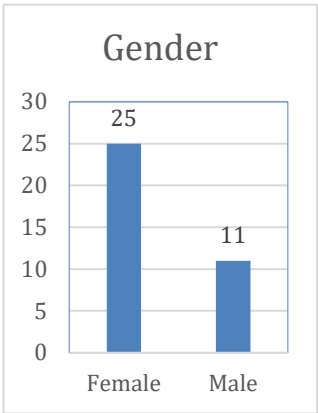


Figure 13: Participant Gender

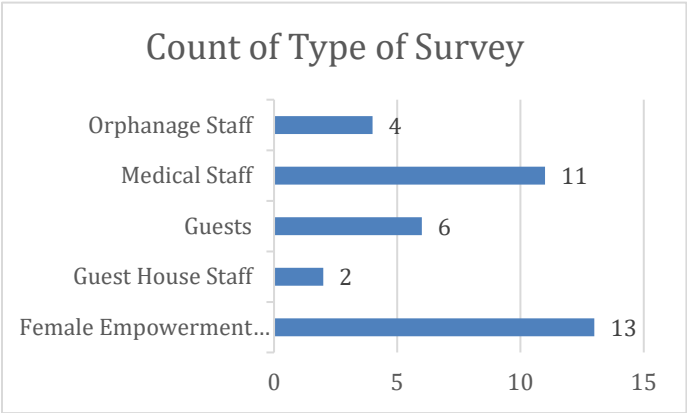


Figure 14: Survey Count

Two of the men present at the time of construction and involved in the design process were from the medical clinic and another is involved in administration and management of C4C. None of the nannies nor guest house staff who were present during design/construction were involved in the process.

Case Study One: The Orphanage

Comfort

The majority of orphanage staff reported spending more than eight hours a day in or around the building. The participants were then asked to rate on a scale of 1-5 how comfortable the space is for the amount of time they spend there, as well as how comfortable the spaces are for the amount of people in them. One being not comfortable at all and five being absolutely comfortable.

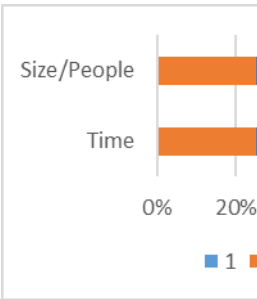


Figure 15: Comfort based on duration of time spent in space and density of people

For the majority of orphanage staff, the spaces in the building are comfortable for the amount of time spent and for the number of people in the space. Participants were also asked to state aspects that made the space comfortable and aspects that made them uncomfortable. Aspects that made the space comfortable include: access to light and water, ability to see children when they go outside, and the type of construction. Aspects that made the space uncomfortable include: shower leaks where there are no longer tiles on the ground. Tiles were at one point on the floor of the orphanage, but after severe water damage, the tiles were ripped up and not all of the tiles were replaced.

General Quality of Spaces and Buildings

Participants were asked to rate the overall quality of the spaces within the building on a scale from 1-5. In the orphanage, the spaces evaluated were the kids’ rooms, kitchen, bathroom, living room, work spaces (i.e. nurses room, etc.), and the building overall. Figure 16 shows a stacked bar graph of the participants responses for each space. The overall quality of the building was evaluated by most participants as a five. The kids’ rooms and living room were unanimously given fives. Yet in the comments, a few women noted that lots of bugs come inside because of the wood furniture. They said this makes them uncomfortable. The bathroom and kitchen showed a disagreement amongst staff. Some say the bathroom and kitchen were five and others were on the opposite end of the spectrum say it was only a one. Reasons most ranked the bathroom highly are that the toilets flush and don’t smell, and that there are rarely plumbing problems. No reasons were given for the low rankings of the bathrooms.

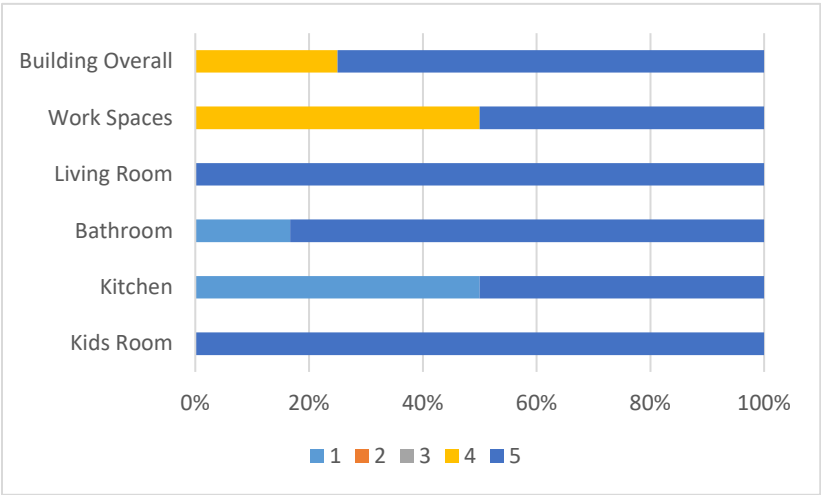


Figure 16: Overall Quality of Spaces in the building and the building overall

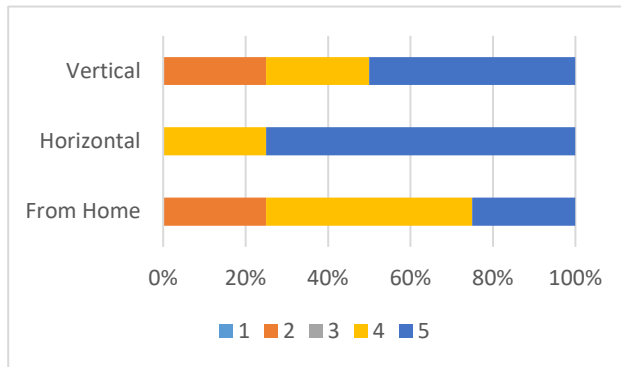
The kitchen originally designed and built in the orphanage was like an American kitchen. The nannies complained after it was built, however, because most Haitian women are taught to cook over an open fire and the designers put a standard stovetop in the kitchen for their use. Thus, an additional cooking area was added to the east of the orphanage building as a separate structure. It is located partially up the adjacent hillside. Nannies must walk outside, where it is often raining, across the exterior play area, where the kids are often playing basketball or soccer, and up the stairs into the cooking area. Nannies do this for before and after the two meals they serve the children. When asked about this situation, the nannies surprisingly said it was not so inconvenient. The stairs are not hard to climb, so it is not a big deal to them. They did, however, say that nothing is stored in the old kitchen now, so it is useless and uncomfortable. The only issue mentioned about the new kitchen is that the smoke from the open fire lingers in the kitchen. This could be due to inadequate air flow through the space and lack of vents that allow the smoke to leave the interior cooking area.

Security and Safety

Participants were asked to rank how safe they felt inside the building on a scale from 1-5. Participants unanimously reported feeling absolutely safe (5). Reasons for this include: gated property, security guards, familiar community outside, lighting, good doors, and the structural quality of the building.

Access

Participants were asked to evaluate the ease of access within the building and from home. Some of the nannies are coming from the nearby town of Petionville,



located four miles from Kenscoff.

This distance can make the commute

Figure 17: Access and Building Circulation

difficult. Chances for Children in also located in the hills, so the staff who walk to work, even if they live close by, must walk up a large hill on the way to or from work. This is especially difficult when it rains (which is frequent in the mountains of Haiti) because the dirt and gravel roads are uneven and get quite muddy.

Regarding the steep vertical circulation and organization of the rooms, one nanny stated, “If I were to build it, I would make rooms for the big kids upstairs and rooms for the babies’ downstairs.” This would help nannies escape the difficulty of carrying water and children up and down stairs. Though the stairs are steep, and carrying water and children up and down is difficult and tiring, the overall circulation inside the building works well according to the staff. The organization of the rooms makes sense, and horizontal circulation and access to rooms is easy.

Temperature

Participants were asked to evaluate their comfort based on the temperature of the space. Orphanage staff unanimously reported the temperature being absolutely comfortable (5).



Figure 18: Does the Orphanage meet your needs?

General Satisfaction

Finally, participants were asked to evaluate on a scale of 1-5 if the building is meeting their needs, and to provide commentary on what needs *are* being met and what needs *are not* being met. Participants

responded with a unanimous “yes.” The building meets the needs of the staff who participated in the survey.

Some needs that the staff mentioned were not being met include the issue of wooden furniture attracting bugs, more accessible bathrooms downstairs, and additional outdoor space. From the behavior mapping, it is easy to see that children spend the majority of the day outside. More outdoor space would help accommodate this time. The staff agrees that the building overall is a comfortable space, and serves the purpose of providing a safe, temporary home for the children who are brought in.

Key findings

1. Majority of staff is comfortable for time there and number of people in the space
2. Access to light and water make the space comfortable.
3. Shower leaks, poor floor finishes, and wood furniture that attract bugs make the space uncomfortable.
4. The kitchen was unsatisfactory to half the participants, due to the inconvenient location, and poor ventilation.

5. These things make the participants feel safe: gated property, security guards, familiar community outside, lighting, good doors, and the structural quality of the building.
6. The overall organization of the rooms works well, but it could be useful to locate the babies' rooms downstairs to avoid carrying water and children up and down the steep stairway.
7. It would be nice to have more accessible bathrooms downstairs and additional outdoor space.

Case Study Two: The Guest House

Comfort

The majority of guest house staff reported spending between 5 and 8 hours a day in or around the building. The guests themselves reported spending the same 5 to 8 hours a day in or around the building. The participants were then asked to rate on a scale of 1-5 how comfortable the space is for the amount of time they spend there, as well as how comfortable the spaces are for the amount of people in them. One being not comfortable at all and five being absolutely comfortable.

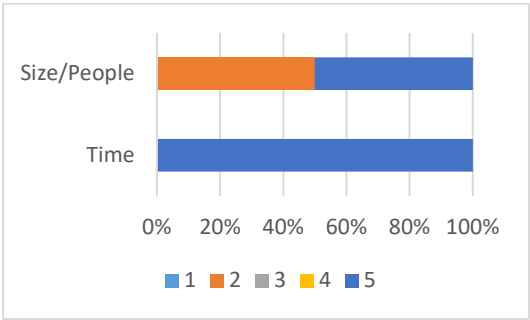


Figure 20: Guest Comfort based on time spent and density of people

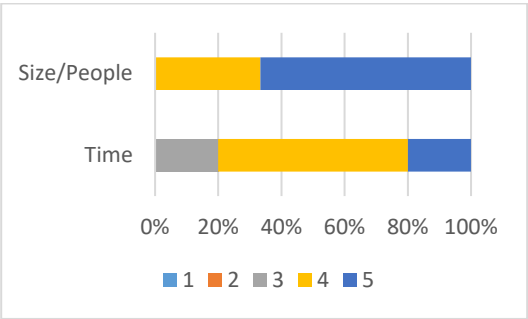


Figure 19: Staff Comfort based on time spent and density of people

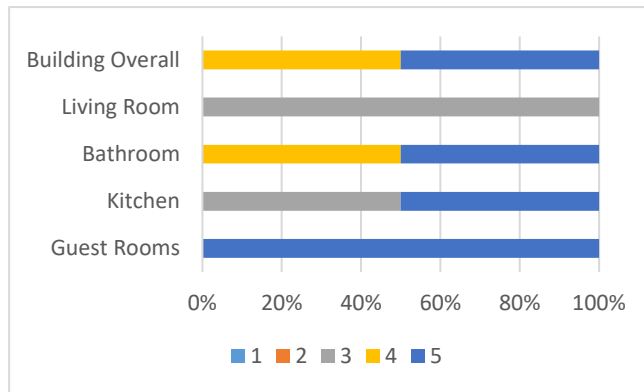


Figure 21: Overall Quality of Spaces as Evaluated by the Guest House Staff

The guest house staff unanimously agreed the building was comfortable for the amount of time spent there. Half of the staff, though, said the size of the space was less comfortable. The guests said the space was average or above average comfort levels

for both the amount of time they spent in the building, as well as for the number of people in the space. Participants were also asked to state aspects that made the space comfortable and aspects that made them uncomfortable. Aspects that made the space comfortable for the guests include: the furniture, natural lighting, brightly painted walls, access to blankets, privacy of the bedrooms, the food and the people. Aspects that made the space uncomfortable for the guests include: low stairway clearance, cold floor tiles, bugs, rats and roosters, and extremely variable temperatures. For the staff, aspects that make the space comfortable include: good temperature, plenty of storage, electricity, and running water. The aspects the staff mentioned that would improve comfort include: additional supplies, lighter furniture, windows on cupboards to see contents, and, generally, more space.

General Quality of Spaces and Buildings

Participants were asked to rate the overall quality of the spaces

within the building on a scale from 1-5.

The spaces evaluated in the Guest

House were the guest rooms, living room, kitchen, bathrooms, and building overall.

Figure 21 and 22 show stacked bar graphs of the Staff and Guest responses. Overall, the staff evaluated the building and all its spaces as average or above average.

The only negative feedback received in this section is that one of the bathrooms has no light, some of the spaces are too high too clean, and that some rooms could use more space.

Although the data show Guests were slightly less satisfied with the bathroom, kitchen and guest rooms, the spaces were still evaluated as average or above average overall quality. The main source of discontentment seems to be the variable temperature. Two guests mentioned the cold and variable temperatures again in this section.

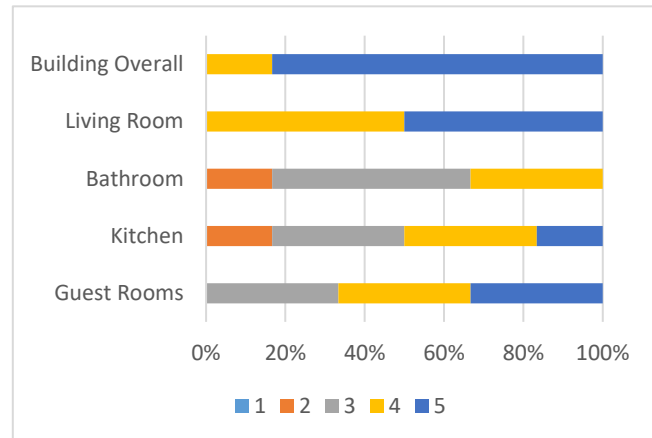


Figure 22: Overall Quality of Spaces as Evaluated by the Guest House Guests

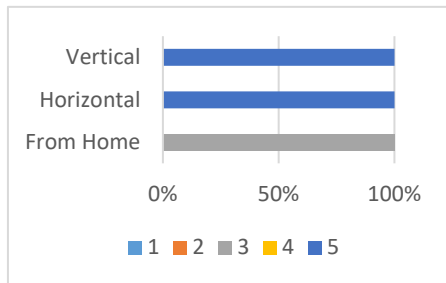


Figure 23: Circulation and Access as Evaluated by the Guest House Staff

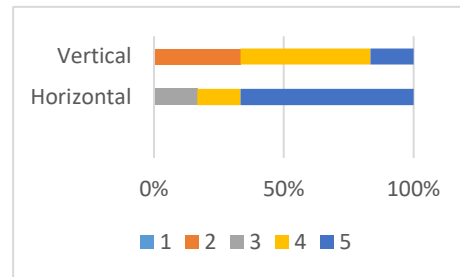


Figure 24: Circulation as Evaluated by the Guest House Guests

Security and Safety

Participants were asked to rank how safe they felt inside the building on a scale from 1-5. Participants unanimously reported feeling absolutely safe (5). Reasons for this include: gated property, security guards, familiar community outside, lighting, and the structural quality of the building.

Access

The Guests and Staff were asked to evaluate the ease of circulation within the building and, for just the Staff, the accessibility from home. The staff unanimously agreed on the quality of the horizontal and vertical circulation, as well as the access to the building from home. Though the access to the building from home is lower than the buildings circulation, it is still evaluated as average. It is probably lower for the same reasons the orphanage staff has trouble getting to the site: weather, road conditions, and distance from home. The Guests were less satisfied with the circulation within the

building. Horizontal circulation was average or above, but vertical circulation had almost a third of participants say it was below average. This is likely due to the steepness of the stairs. Some of the guests may have ground floor rooms, while others must use the steep stairs to get to their living quarters. This could account for the large difference between the Guests evaluation of the buildings vertical circulation.

Temperature

Participants were also asked their level of comfort based on the temperature in the space. Both 50% of the staff and 50% of the guests were unsatisfied with the temperature in the Guest House. Guests were slightly more unsatisfied, however: the other 50% of the staff were absolutely comfortable in the temperature, and 33% of the guests were right in the middle, neither comfortable nor uncomfortable. Only 17% of guests reported a positive level of comfort.

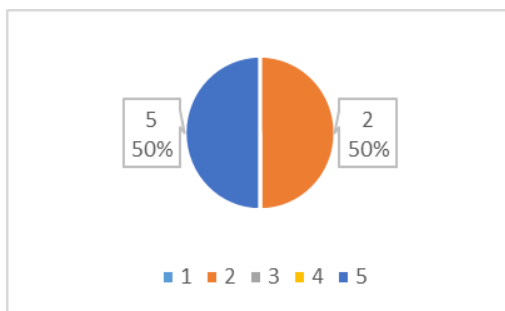


Figure 25: Temperature Comfort as Evaluated by the Guest House Staff

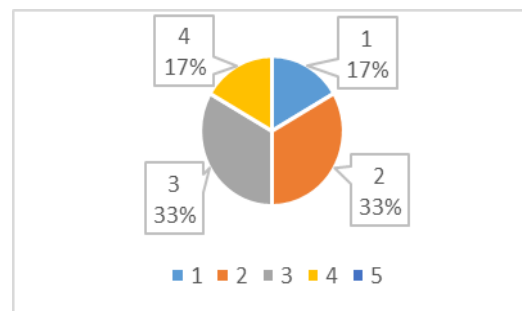


Figure 26: Temperature Comfort as Evaluated by the Guest House Guests

General Satisfaction

Finally, participants were asked to evaluate on a scale of 1-5 if the building is meeting their needs, and to provide commentary on what needs *are* being met and what needs *are not* being met. Participants responded with a unanimous “yes.” The building meets the needs of the staff and guests who participated in the survey.



Figure 27: Does the Guest House meet your needs?

The staff agreed that they have everything they need to do their jobs. However, the staff did identify spatial and furniture-related aspects that could be improved. These aspects include: window coverings, better furniture, more storage, more counterspace, and more space to move existing furniture when

cleaning. Though the Guests also agreed the building is nice and functional by Haitian standards, needs that were unmet include: heating and air conditioning, running water, and dependable electricity. These, however, are not aspects that the design could change, but rather are standard Haitian living-conditions.

Key Findings

1. The staff was generally more comfortable in the space for the amount of time they spent there, but were far less comfortable on average for the amount of people relevant to the size of the spaces.
2. The furniture, natural lighting, brightly painted walls, access to blankets, privacy of the bedrooms, the food and the people contribute to guest comfort and satisfaction.
3. Low stairway clearance, cold floor tiles, bugs, rats and roosters, and extremely variable temperatures contribute to guest discomfort.
4. Good temperature, plenty of storage, electricity, and running water contribute to staff comfort and satisfaction.
5. Additional supplies, lighter furniture, windows on cupboards to see contents, more natural light, and, generally, more space would improve staff comfort and satisfaction.
6. Variable temperature and poor vertical circulation in the guest house were two main sources of discomfort for guests.

Case Study Three (A): The Medical Clinic

Comfort

All Medical Clinic Staff reported spending 7 or more hours a day in or around the building. The participants were then asked to rate on a scale of 1-5 how comfortable the space is for the amount of time they spend there, as well as how comfortable the spaces are for the amount of people in them. One being not comfortable at all and five

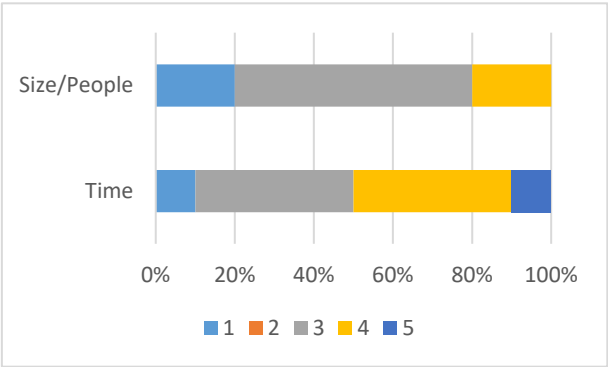


Figure 28: Medical Clinic Staff Comfort based on time spent and density of people

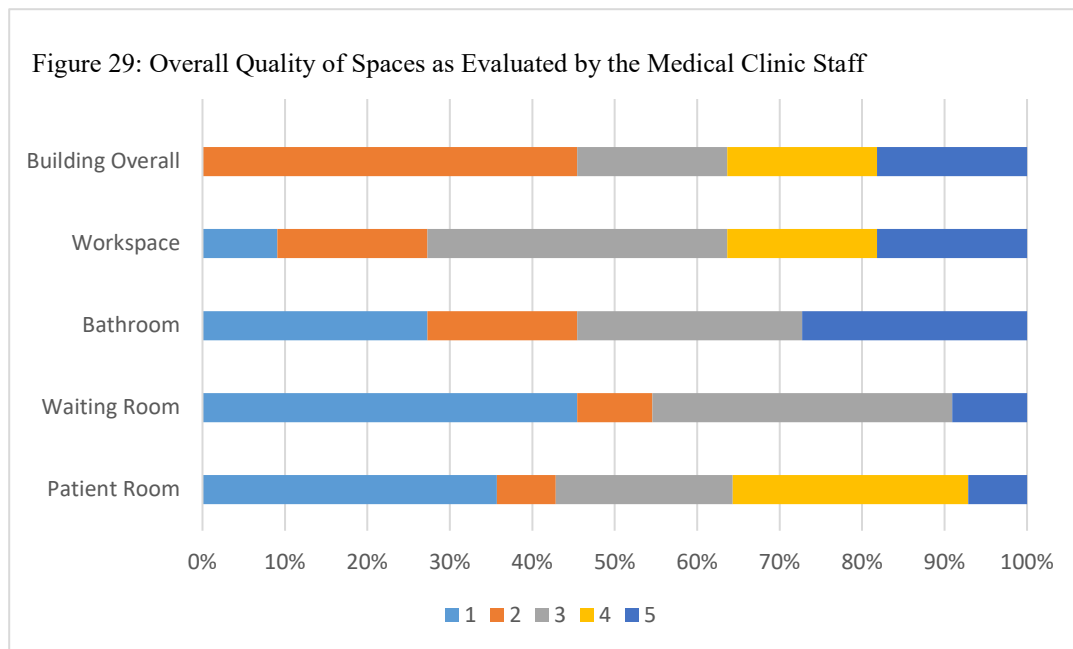
being absolutely comfortable. The comfort evaluation results from the Medical Clinic Staff are by far the most variable. There are more reports of discontent for the Medical Clinic than any of the other C4C buildings.

Participants were asked to state aspects that made that contributed to their feelings of comfort or lack thereof. Aspects that made the space comfortable include: the other staff members, the type of construction, and the lighting. Aspects that made the space uncomfortable include: lack of storage, frequent water leaks from outside, poor organization of rooms, lack of privacy in some areas, and in some cases, the sizes of the rooms are inadequate.

General Quality of Spaces and Buildings

Participants were asked to rate the overall quality of the spaces within the building on a scale from 1-5. In the Medical Clinic, the spaces evaluated were the waiting room, patient rooms, the bathroom, additional work spaces, and the building overall. Figure 27 shows a stacked bar graph of the participants responses.

Almost half of the participants said the overall quality of the building, the



bathroom, and the patient rooms are below average. Over half of the participants said the waiting room is below average. The aspects that contribute to this level of satisfaction include water that comes into the building when it rains, the noise level, and the cold temperature in the winter months. Many of the staff members also commented that the size of the facility is too small, the size of the waiting room is too small, and there is not enough room for all the materials they need. Many of the staff say patients also complain about the quality of the toilets. Despite this, however, one staff member pointed out that though there are these flaws, he thinks the space meets patients' needs

because they are the only place all around Kenscoff that is equipped to the level that they are.

Security and Safety

Participants were asked to rank how safe they felt inside the building on a scale from 1-5. Whereas the Orphanage staff and Guest House uses unanimously reported feeling absolutely safe (5), the Medical Clinic is much more scattered. Almost 30% of participants do not feel safe. For those who said they felt safe in the building, the reasons include: gated property, security guards, and

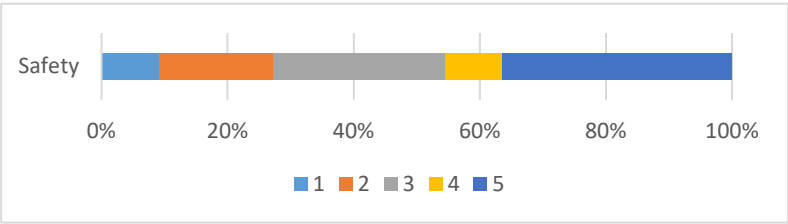


Figure 30: Safety as Evaluated by the Medical Clinic Staff

lighting.

Access

Participants were asked to evaluate the ease of circulation within the building and of access from home. Because the Medical Clinic is located on the ground floor, the

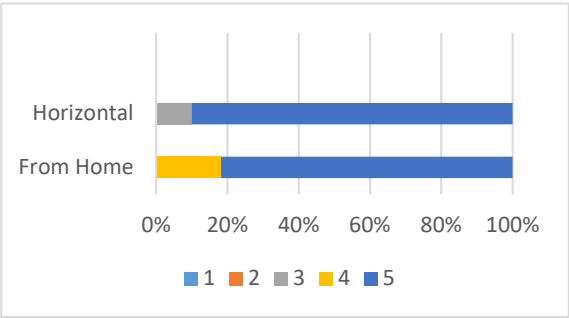


Figure 31: Circulation and Access as Evaluated by the Medical Clinic Staff

vertical circulation was not evaluated.

Horizontal circulation exceeded satisfaction, meaning that hallways are

easy to maneuver through. The staff also agreed that accessing the building from

home is easy.

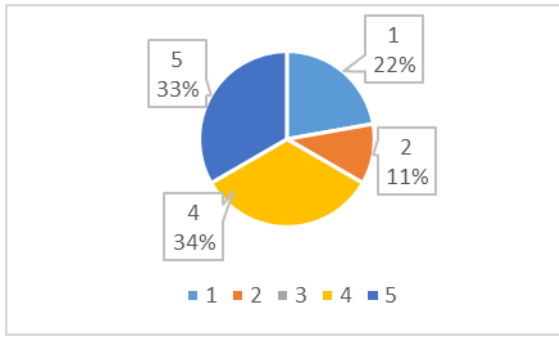


Figure 32: Temperature Comfort as Evaluated by the Medical Clinic Staff

Temperature

Participants were also asked their level of comfort based on the temperature in the space. Figure 32 shows the participants responses, with (1) being not comfortable at all and (5) being absolutely comfortable. Seventy-seven (77%) of the

staff indicate feeling comfortable with the temperature in the space.

General Satisfaction

Finally, participants were asked to evaluate on a scale of 1-5 if the building is meeting their needs, and to provide commentary on what needs *are* being met and what needs *are not* being met. Over half of participants said the building *does not* meet their needs. Participants said the reasons for this include the waiting area being inadequate,

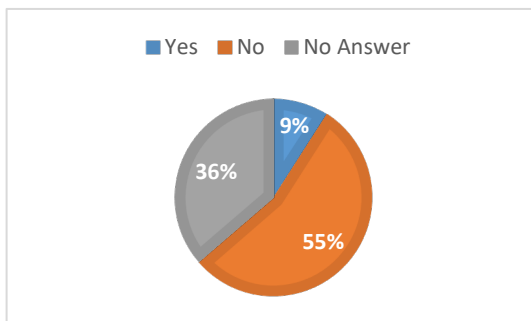


Figure 33: Does the Medical Clinic meet your needs?

the size of the rooms and overall building being too small, and the organization of the rooms being inadequate. One participant identified the need for parking. Two participants did leave positive comments about the building. One said the building is

safe, secure, and structurally sound. The other participant noted that the staff has the materials they need to do their job, and so in that way, their needs are met.

Key Findings

1. Coworkers, the construction type, and lighting make staff comfortable.
2. Lack of storage, frequent water leaks from outside, poor organization of rooms, lack of privacy in some areas, water leaks, noise level, temperature, bathroom facility, waiting area, and, in some cases, the inadequate sizes of the rooms, contribute to staff discomfort and dissatisfaction.

Case Study Three (B): Women's Empowerment Programs

Comfort

The majority of women in the Women's Empowerment Programs reported spending 3 to 4 hours a day in the building, with a handful of the women spending up to eight hours a day. The women were then asked to rate on a scale of 1-5 how comfortable the space is for the amount of time they spend there, as well as how comfortable the spaces are for the amount of people in them. One being not comfortable at all and five being absolutely comfortable.

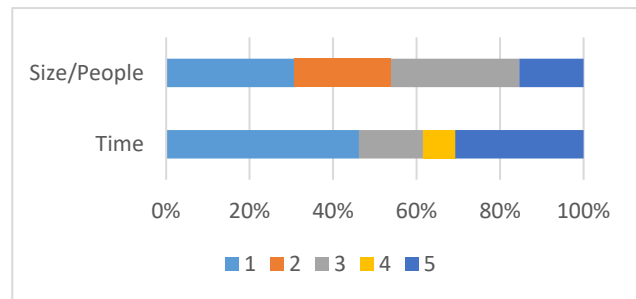
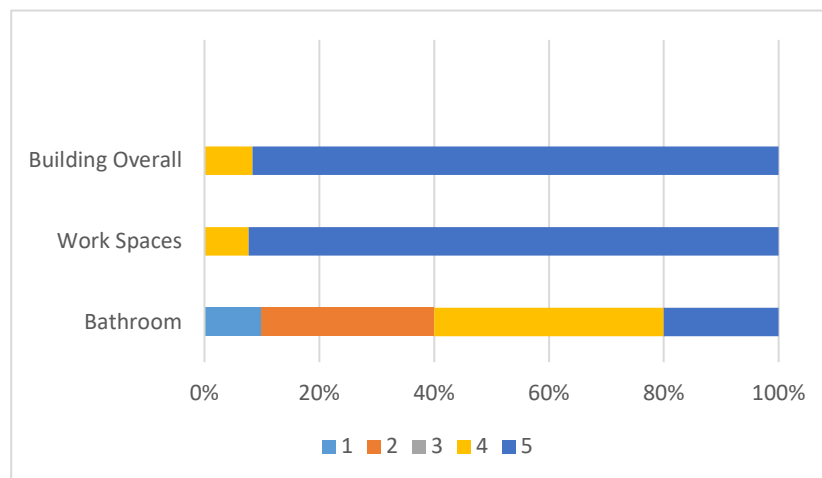


Figure 34: WE comfort based on time spent and density of people

For almost half of the women, the spaces in the building are not comfortable for the amount of time spent there, and for over half the women, the size of the space is not comfortable for the amount of people there. Participants were also asked to state aspects that make the space comfortable and aspects that make them uncomfortable. Aspects that make the space comfortable include: the people and the opportunity to learn. Aspects that make the space uncomfortable include: the chairs and tables, inadequate amount of space and supplies, and poor lighting.

General Quality of Spaces and Buildings

Participants were asked to rate the overall quality of the spaces within the building on a scale from 1 to 5. For the Women’s Empowerment Program, the spaces evaluated were the workspaces, bathroom, and building overall. Figure 32 shows a stacked bar graph of the participants responses for each space. The overall quality of the building and the work spaces was evaluated as greater than average. The bathroom, however, was less than satisfactory for 40% of the women. This makes sense because there is actually no indoor bathroom for this space. The women use an exterior restroom located behind the building. Therefore, each time a woman has to use the restroom, she has to walk down



stairs and around to the back of the building.

Figure 35: Overall Quality of Building and Spaces as Evaluated by the Women’s Empowerment Participants

Security and Safety

Participants

were asked to rank how safe they felt inside the building on a scale from 1 to 5.

Participants unanimously reported feeling absolutely safe (5). Reasons for this include: security guards, familiar community, and comfort from the amount of time the women spend there.

Access

The women were also asked to evaluate the ease of circulation within the building and the accessibility from home. The women unanimously agreed on the quality of the horizontal and vertical circulation, and the majority agreed on the ease of access from home.

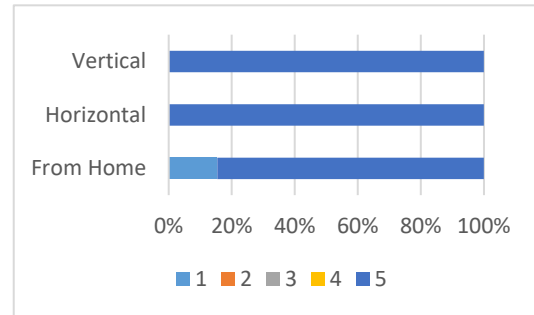


Figure 36: Circulation and Access as Evaluated by the Women's Empowerment Participants

Temperature

Participants were also asked their level of comfort based on the temperature in the space. Seventy-five (75%) percent of participants reported the temperature feeling absolutely comfortable (5). Only 17% indicated the temperature was not comfortable (i.e. responses of a 1 or 2).

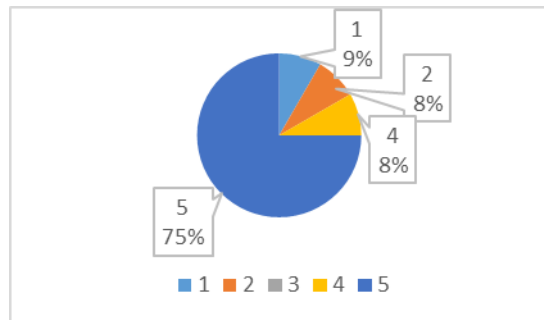


Figure 37: Temperature Comfort as Evaluated by the Women's Empowerment Participants

General Satisfaction

Finally, participants were asked to evaluate on a scale of 1 to 5 whether or not the building meets their needs, and to provide commentary on what needs *are*

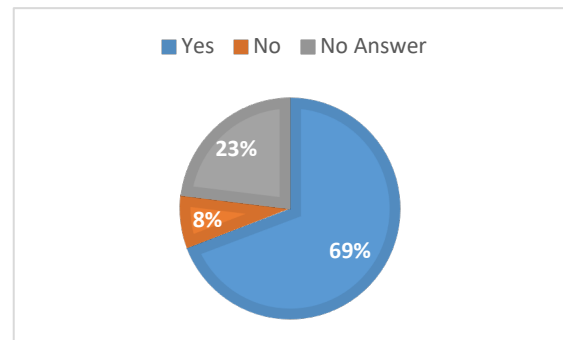


Figure 38: Do the Women's Empowerment spaces meet your needs?

being met and what needs *are not* being met. Sixty-nine percent of the participants said the building meets their needs. The women agreed that they have everything they need to do their jobs. However, they did identify aspects that could be improved, including: more space and sewing supplies, more comfortable furniture, better lighting, and access to a toilet. Some of the women also commented that building is beautiful and well made, and that they feel safe and secure in the space.

Key Findings

1. The chairs and tables, inadequate amount of space and supplies, poor lighting, uncomfortable furniture and variable temperature contribute to participant discomfort and dissatisfaction.
2. Lack of access to a bathroom also contributes to participant discomfort and dissatisfaction.

Additional Questionnaire Comments

This table outlines the comments given by participants at the end of the survey.

Building	Encouraging Comments	Critical Comments
Orphanage	<p>The building is beautiful and well-made.</p> <p>I feel safe, and I have work.</p> <p>I know I am secure.</p>	<p>Not enough space for all the people</p> <p>We need machines, thread, scissors, chalk, seam ripper, and more space in the room</p> <p>We need more space</p> <p>More machines and more space would be nice.</p> <p>More fabric, a toilet, and more chairs would be nice.</p> <p>It would be nice to have more light, a balcony, and a toilet.</p>
Medical Clinic	<p>Building is very secure and safe. It is made according to the rules of earthquake construction. I would say most of the buildings in Haiti were supposed to be like this because natural disasters may occur at any time.</p> <p>We have the materials we need for our job.</p>	<p>For now, we need more equipment and to have another building in the future for the hospital.</p> <p>The space needs to be bigger.</p> <p>It would be good for employees to have a place for parking because some of their cars have problems now because of the road conditions.</p> <p>I would like for them to make the space bigger and the rooms bigger, and then the rooms need to be better organized with a toilet, kitchen, and rooms.</p> <p>I think we need a better organization of the rooms. The rooms need to be larger. We need comfortable chairs and desks.</p> <p>I would like for them to make the space bigger so it is more comfortable.</p> <p>The space would be more comfortable if the waiting area and the size of my room were better.</p>
Women's Empower	<p>It (the building) is beautiful and well made.</p>	<p>There is not enough space for all the people. More machines and materials would be nice.</p>

ment Offices	<p>I feel safe. I have work.</p> <p>I know I am secure.</p>	<p>It would be nice to have more space so more people can work. More fabric to work with, a toilet and more chairs.</p> <p>More machines, thread, scissors, chalk, seam ripper, more space in the room, more light, a balcony and a toilet.</p>
Guest House Guests:	<p>This is a convenient place to stay. By Haiti standards, it is a nice and functional building. The staff does their best to accommodate the guests.</p> <p>All my needs besides heat, air conditioning, running water, and hot water are met.</p> <p>The building is functional, clean, and safe.</p> <p>There are meals, bedding and security.</p> <p>There is food, shelter and power. Everyone is very kind.</p> <p>All my needs are met here.</p>	<p>There are occasional power outages.</p> <p>The needs I have that aren't met are heat, air conditioning, running water, and hot water.</p> <p>Power outages, hot water, and water pressure.</p>
Guest House Staff:	<p>I like everything. I have everything I need to do my job.</p>	<p>We need new linens, sheets, towels, curtains, chairs, couches, more storage, more hooks for shower curtains.</p> <p>There is not enough space to move things to clean behind. More cupboards and countertop space.</p>

Figure 39: Questionnaire Comments

Summary of Survey Data

The following table outlines a summary of the questionnaire responses. Red highlights indicate areas where the users were unsatisfied.

Building	Comfort based on time	Comfort based on size	Overall building quality	Living room	Bathroom	Kitchen	Bedrooms (Patient Rooms)	Workspaces	Waiting Room	Safety	Vertical Circulation	Horizontal Circulation	Ease of Access	Temperature	Overall: Needs met?
Orphanage	5 (75%)	5 (75%)	5 (74%)	5 (100%)	5 (83%)	1/5 (50%)	5 (100%)	4/5 (50%)	NA	5 (100%)	5 (50%)	5 (75%)	4 (50%)	5 (100%)	Yes (100%)
Medical Clinic	3 (60%)	3/4 (40%)	2 (45%)	NA	1/3/5 (28%)	NA	1 (35%)	3 (35%)	1 (45%)	5 (38%)	NA	5 (90%)	5 (82%)	5 (75%)	No (55%)
Women's Empowerment	1 (45%)	1/3 (30%)	5 (95%)	NA	4 (40%)	NA	NA	5 (95%)	NA	5 (100%)	5 (100%)	5 (100%)	5 (90%)	4 (34%)	Yes (69%)
Guest House: Staff	5 (100%)	5/2 (50%)	5/4 (50%)	3 (100%)	4/5 (50%)	3/5 (50%)	5 (100%)	NA	NA	5 (100%)	5 (100%)	5 (100%)	3 (100%)	5,2 (50%)	Yes (100%)
Guest House: Guests	4 (60%)	5 (75%)	5 (82%)	4/5 (50%)	3 (50%)	3/4 (35%)	3/4/5 (33%)	NA	NA	5 (100%)	4 (50%)	5 (65%)	NA	3,2 (33%)	Yes (100%)

Figure 40: Table Summary of Questionnaire Results

In the orphanage, staff only indicate being unsatisfied with the quality of the kitchen. The Medical Clinic, by far, had the highest level of dissatisfaction and discomfort. All areas that the Medical staff indicate being unsatisfied were based on the quality of the spaces. These include the building overall, the bathroom, the patient rooms, the workspaces, and the waiting room. Fifty-five percent (55%) of the Medical Staff indicated that the building overall did not meet their needs. The only areas that the Women in the Women's Empowerment Spaces indicated feeling unsatisfied were their

comfort levels based on the time they spent in the space and the size of the space relative to the number of people. The women's comments support this. Many women were unsatisfied with the size of the space they work in. The only issue indicated in the Guest House was related to temperature.

The quality ring below graphically depicts this information. The innermost circle is a low rating (1), indicating low quality, discomfort or dissatisfaction as reported by users in the survey. The outermost circle is the best rating (5), indicating great quality, absolute comfort or satisfaction. Line breaks mean that that area was not evaluated for that specific building. For example, inward from the Waiting Room label there is only a Medical Clinic marker and the other lines are broken (e.g. at Workspaces) then resume again at the following label (e.g. Safety). This means that that specific aspect was not evaluated for that building.

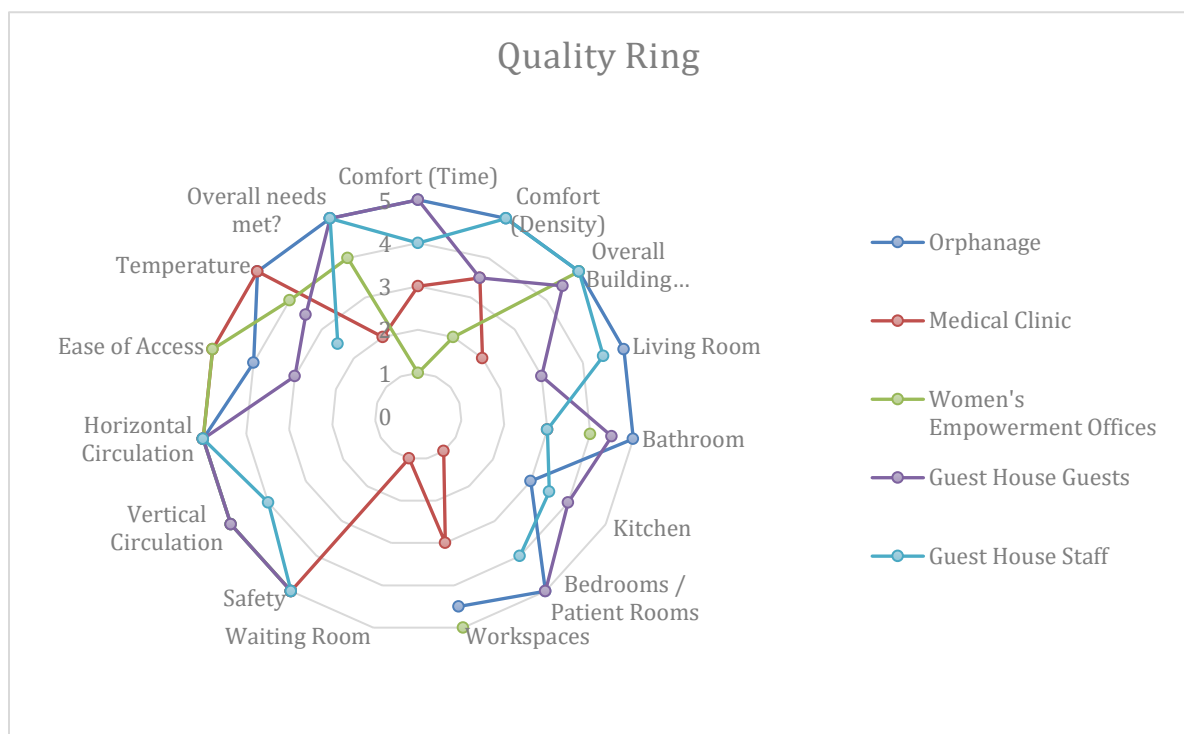


Figure 41: Graphic Summary of Questionnaire Results

Chapter 6: Recommendations and Design Implications

Once again, the purpose of this thesis is not to propose solutions, but rather to analyze a series of buildings. However, an analysis of buildings cannot come without some sort of suggestions for improvement. Thus, this chapter develops results from the evaluation into general suggestions for changes in the existing setting that may improve user satisfaction in the buildings. This is followed by a discussion of possibilities for continued research to further this area of study, and finally concludes with a Call to Architects and Designers.

Additionally, not all issues with the user comfort and satisfaction can be solved with architecture related solutions. The architect in a project has the role of producing detailed designs of a concept or idea, which involves a great deal of technical knowledge that are both then translated into detailed drawings. These drawings become construction documents that translate the design into instructions and technical specifications for contractors and builders. Once the project meets the construction stage, an architect should be involved in site visits and meetings, overseeing the construction and dealing with any problems that arise. In Haiti, this process may be very different, especially in the case of buildings like the orphanage, where a steel design / product company from the US creates documents, but the company's involvement in the construction phase is unknown, but likely very limited. Thus, some issues identified in this evaluation are design issues, but also some are builder issues that had no supervision.

Recommendations for Change

Indoor and Outdoor Spaces

The evaluation results indicate that the most popular location on the orphanage site is the adjacent outdoor space. Every day, guests, staff, and children spend the most time in this space. There is no outdoor seating in this space. Behavior observations show that guests and staff often bring chairs outside from the dining room, but there is no formal outdoor seating. Behavior observations also show that people sit on the low curb connected to the exterior wall. If this curb were raised a bit during construction, to be at seat level, there would be more built-in seating for users.

There is a similar situation in the outdoor area of the guest house. There is no formal seating, but the top of the retaining wall is raised a decent level above the ground and has a relatively smooth surface, making it far more comfortable seating. This is a good model for how to utilize retaining walls as seating.

Inside the buildings, the staff was generally comfortable for the amount of time they spent in the spaces, but far less comfortable on average for the amount of people relevant to the size of the spaces. The Women's Empowerment programs have grown rapidly in the past few years. So rapidly, that they seem to have outgrown their workspace. The women identified this issue in the questionnaires, and the issue can also be identified in the physical traces where work stations are being built in the hallways. The questionnaires also indicate that space needs are a problem in the guest house and the medical clinic as well.

Degrees of Privacy

The results of this evaluation indicate that the private spaces contribute greatly to user satisfaction. There are great degrees of privacy in the buildings. In the orphanage, the bulk of the ground floor is public space. There is a small private room and bathroom, usually used by on-site or visiting staff, located down a hallway, behind closed doors. The rooms' distance from the main public space make it clear that this is a private area. The children's rooms are located on the second floor. This elevation change clearly sets the private rooms apart from the public indoor and outdoor areas on the ground floor.

The guest house also distinguishes public and private space using elevation changes. The common area is on the main level, and most of the guest rooms are located upstairs. The two guest rooms that are located on the ground floor are separated from the common spaces with a vestibule. This increases the feeling of privacy, thus of comfort, for the guests.

Circulation

Because Kenscoff is in the mountains of Haiti, there are steep elevation changes on the site, resulting in steep stairways. There is no code regulating stairs in Haiti, so each of the stairways is very different, but all are very steep. Even between each individual step, there can be a big difference in the rise and run. These steep, and sometimes quite narrow, stairs cause issues for guests and for orphanage staff. The

nannies in the orphanage said it is hard to carry water and children up and down the stairs. The recommendation one nanny suggested was to locate the infant and toddler rooms downstairs to avoid the steep stairway. The nannies also must go up a set of exterior stairs to get to the kitchen, then carry the food back down stairs before and after the children's meals. This is quite inconvenient, especially when it is raining outside (as it often does in the mountains of Haiti). It would be better if the kitchen were located adjacent to and on the same floor level as the dining room.

Temperature

Temperature varies widely in the mountains of Haiti. The nights are relatively cold, the days are warm, and it often rains in the afternoon. The variable temperatures contribute to discomfort for users in the guest house, medical clinic, and Women's Empowerment programs. The questionnaires indicate that guests are regularly cold in the evenings, and the comments indicate the Women's Empowerment workspaces get incredibly warm in the afternoons. The number of women working together in a relatively small space adds more to the interior temperature. A simple fix to this issue is to add exterior shading that will reduce the buildings solar gains. When economically feasible, adding insulation will also help increase thermal control in the buildings.

Safety

The results of the questionnaires indicate users feel safe in the buildings and on the site. The things that contribute to this safety include the gated property, security guards manning the gate, natural and electrical lighting in the building, and the familiar community of people on site. A few participants also mentioned the structural quality of the buildings contributing to their feeling of safety.

Light and Water

Light and water also play a significant role in user comfort and satisfaction. Because light and water are not guaranteed in Haiti, staff are especially satisfied by access to light and running water. The evaluation indicates that water leaks are an issue in the orphanage, medical clinic, and women's empowerment offices. The orphanage staff indicated shower leaks in the building, the medical staff indicated frequent water leaks, and the women in the Zel program move their chairs and the storage away from one of the windows because it leaks every time it rains. My first summer in Haiti, we spent the trip ripping up floor tiles in the orphanage and scraping mildew off the floor. Water seeping into the building caused this damage. In fact, water intrusion makes up more than 70 percent of construction litigation in the United States, and "40 percent of building-related problems are due to water intrusion" (Seward 2011).

Diagnosing leaks is the easy part; fixing a leak is much more difficult. There are no magic bullets or guarantees for stopping water penetration. Often the leak is

originating from multiple sources and hidden defects are not readily apparent. Better window and sealant details from the start might help reduce water leaks in the building, but the best way to prevent leaks is with an ongoing program of proper maintenance. The effects of weathering demand regular maintenance to identify developing trouble spots early. Most materials only last an average of five years. C4C has a few on-site building and program managers; It would be wise for these staff members to conduct regular inspections each month, paying close attention to ponding on roofs, any cracks or openings, surface deterioration, and any other signs of water infiltration (Varone 2003).

The results of the evaluation also indicate that access to natural light plays a crucial role in occupant comfort and satisfaction. Users who feel that they do not have access to natural light are less satisfied. This makes sense, for there are many research-proven benefits related to daylit environments. Scientists at the Lighting Research Center (LRC), in Troy, N.Y., for example, have reported that “daylit environments increase occupant productivity and comfort, and provide the mental and visual stimulation necessary to regulate human circadian rhythms” (Van Den Wymelenberg 2014). Thus, it is important to supply a generous number of windows at an appropriate size, relative to the orientation, to provide the occupants with daylight for their activities, and to ensure the health and productive benefits of daylighting are obtained. The exterior shading devices suggested in the above section on temperature should be coordinated with the buildings window design to ensure appropriate levels of daylighting are achieved without accumulating too much solar gain.

Furniture and Storage

The results of the evaluation also indicate that a lack of storage and poor furniture choices are two main issues in the buildings that result in dissatisfied occupants. The female staff in the guest house said that the furniture is too heavy to move and often too big to move around the room when they are cleaning. The nannies in the orphanage said the wooden furniture attracts bugs, making the staff uncomfortable. The women in the empowerment programs complained that the chairs are uncomfortable for the amount of time that they spend on them. Chair cushions could be a quick-fix solution to this issue.

The results of the evaluation indicate the medical clinic staff and guest house staff are unsatisfied with the amount of storage in the buildings. Physical Traces show storage is also an issue in the Women's Empowerment Programs. None of the bedrooms in the orphanage or the guest house have any sort of storage closet. There is a storage closet in the hallway of the guest house, and a room in the orphanage that has been adapted to meet storage needs. Rather than closets or built in storage, there are often shelving units or dressers in the rooms. This sometimes meets the spatial requirements for the items needing storage, but as in the case of the Women's Empowerment programs, it does not. This leads to cluttered spaces that are hard to maneuver and work in. There may be a cultural aspect to the lack of closets and storage space since material possessions are less prominent in Haiti. But because these buildings are functioning as businesses and medical facilities, there is a greater need. An easy fix for the women's empowerment offices may be the addition of storage cabinets along the exterior walls that also function as working desk space. Another solution could be expanding the

width of the exposed, horizontal steel structure on the exterior walls of the room to create “built-in” storage space.

Summary

The overall findings of this Post Occupancy Evaluation suggest that the Chances for Children orphanage, guest house, and women’s empowerment program offices successfully meet the needs of the buildings’ users, and according to the survey participants, exceed the quality of other buildings in Haiti. According to participants, the only aspect of the orphanage that was unsatisfactory was the kitchen; the only aspect of the Guest House was the temperature. The quality of spaces, circulation and access, and temperature of the Women’s Empowerment spaces was effective at meeting the needs of the buildings’ occupants. The only aspects participants indicated as unsatisfactory were comfort based on the duration of time spent in the building and comfort relative to density of people in the space. The results of this thesis also indicate aspects that the Medical Clinic staff found unsatisfactory, these aspects being the quality of the building, bathroom, patient rooms, workspaces, and waiting room. The evaluation also identified problems related to water leakage, temperature, storage, and vertical circulation.

This thesis reveals how the Chances for Children buildings are being used, and what design elements contribute to the success or failure of the buildings’ ability to satisfy users’ needs. The research results clearly indicate that the users, overall, respond positively to the buildings on the Chances for Children site. Many aspects of the design of these buildings are tied to the specifics of the programmatic, geographic, and

organizational context in which the buildings were built. Other orphanages, medical clinics, and business offices in Haiti may look nothing like the spaces in these buildings, but it does not necessarily mean that they are any more or less successful. The important qualities and features contributing to the success of these buildings can be applied in many situations and take many different forms. The hope is that this thesis can contribute to the underdeveloped body of literature and analyses on the successful design of the built environment in Haiti, and that it will spark the reader's interest in evolving Haitian construction methods and design choices.

Recommendations for Future Research

This post-occupancy evaluation has responded to the lack of building analyses of completed building projects in Haiti. It compiled survey questions with a focus on general building quality and user comfort and satisfaction. The data collected on the Chances for Children buildings would be strengthened by further evaluation of similar building types in a broader range of Haiti. As more buildings are evaluated and more data is collected, it will be easier to understand the quality and implications of the results from this study and how Chances for Children's buildings compare to others in Haiti.

The results of this study indicate that the acceptable stair steepness for buildings in Haiti would be worth an investigation. Without a national code, stairs vary in steepness and width. A study of stairs and the ways elevation changes are addressed in Haiti would contribute to building and site design, and provide information that could be used in future years to establish a national code.

The effect of light, water, and temperature on user satisfaction and comfort could be explored much further. The presence and degree of these elements undoubtedly varies greatly between Haiti and the United States. Thus, the degree of toleration and comfort is much different for users as well. A study of how these elements are addressed in Haiti would be useful.

This thesis focused more on user comfort and general building quality from the users' perspective, and far less on quantitative analyses of the buildings' performance. A more in-depth study that includes noise levels, lighting levels, temperature and humidity, building energy usage, and ventilation would create a more robust set of data. It would also provide more comparable data, based on quantitative data rather than human opinion, that may be more useful in comparing buildings to one another in a growing body of literature and analysis.

A Challenge to Architects and Designers

One of the biggest problems in developing countries today is the failure of decision-makers to identify and contribute actively to a larger vision. In fact, the absence of vision-both in regard to seeing the future and to truly seeing the present-is part of a general abdication of responsibility. Often, citizens of developing countries look to the "experts" or the aid organizations on the assumption that they know best and have the resources. On the contrary, projects conceived, designed, and realized by experts are too often failures because they rely on a blueprint approach to rebuild and redevelop. Too often, this approach results in the economically non-poor making all the decisions about the project and then doing the project to the economically poor, hoping

to develop a standardized product that can be applied on a greater scale to other suffering or impoverished areas. Although this cookie cutter approach sounds efficient, it often fails because it imposes solutions on poor communities that are inconsistent with local culture and that do not involve participation or encourage ownership (Corbett, et al., 134). Architectural development theories and ideologies like this fail precisely where they should be focused: community focused design that understands and encourages existing culture, intentional and committed responsibility to training local inhabitants for a self-sustaining future of development, and policies for the service and well-being of the citizens for decades to come.

It does not work to simply throw money at the issue. Despite an estimated \$2.3 trillion in foreign aid dispensed from Western nations during the post-World War II era (William Easterly, 4) more than 2.5 billion people, approximately 40 percent of the world's population, still live on less than 2 dollars per day (Chen and Ravallion). And it does not work to simply send short-term staff and volunteers to the immediate crisis, culminating in a disorganized tangle of agencies and NGOs that is present at the start of the disaster, then disband a few weeks later leaving little accumulated wisdom and no structure for continued development (Sinclair, et al., 46).

Far from being irrelevant to the development of impoverished countries, architects are much needed. But they will have to be a different kind of architect, open to different ways of thinking about design and about the role and responsibilities of architects in the social, economic, and political spheres. We have to be actively and continually engaged with planners, policy makers, aid organizations and with professionals in other disciplines, as well as (and especially) with local inhabitants

whose lives are directly affected. This engagement can no longer be just theoretical discussions of idealistic ideals, but must be in the creation and actualization of practical, innovative, and purposeful interventions.

The goal is not to “deal with” poverty or developing countries with the intention of creating a world that looks exactly like America in every city and countryside. Rather, the goal is to see developing countries like Haiti as potentially vital, vibrant places, from whose successes we can learn and whose failures we can seek to mitigate. Haiti holds the potential for remarkable design innovation and noteworthy architectural fulfillment, but we must see this potential more than just when disaster strikes. We must see it as worthy of time, energy, and commitment not just when the need is immediate, but long after news of the disaster has left the media. We must evaluate the work we have done and allow it to influence the way we design in the future. We have to be a generation of architects and designers who are willing to engage, to learn about and see value in cultures different from our own, and to work alongside developing communities with vision, responsibility, and purpose.

“Architects and their professional colleagues must awaken to the realization that we serve all humanity, regardless of location or means—and we serve at the pleasure of those whom our work affects. Let us seek to be remembered not only for the brick-and-mortar of our accomplishments, but for their capacity to contribute meaningfully to society.”

— Andres Lepik

Appendices

Appendix A – IRB Approval and Research Documents



UNIVERSITY OF OREGON

DATE: November 01, 2017 **IRB Protocol Number: 09112017.008**

TO: Chelsey Luiz, Principal Investigator
Department of Design Architecture & Interior Architecture

RE: Protocol entitled, "Architectural Development in Haiti: a Post Occupancy Analysis"

**Notice of IRB Review and Exempt Determination
as per Title 45 CFR Part 46.101 (b)(2)**

The above protocol has been reviewed by the University of Oregon Institutional Review Board and Research Compliance Services. This is a minimal risk research protocol that qualifies for an exemption from IRB review under 45 CFR 46.101(b)(2) for research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior.

Please note that you will not be required to submit continuing reviews for this protocol, however, you must submit any changes to the protocol to Research Compliance Services for assessment to verify that the protocol continues to qualify for exemption. **This exempt determination will expire October 31, 2022.** Should your research continue beyond expiration date, you will need to submit a new protocol application.

Please note, this determination is contingent upon the following:

- The final translated written consent form must be submitted to Research Compliance Services prior to use with participants.

Your responsibility as a Principal Investigator also includes:

- Obtaining written documentation of the appropriate permissions from public school districts, institutions, agencies, or other organizations, etc., prior to conducting your research
- Notifying Research Compliance Services of any change in Principal Investigator
- Notifying Research Compliance Services of any changes to or supplemental funding
- Retaining copies of this determination, any signed consent forms, and related research materials for five years after conclusion of your study or the closure of your sponsored research, whichever comes last.

As with all Human Subject Research, exempt research is subject to periodic Post Approval Monitoring review.

If you have any questions regarding your protocol or the review process, please contact Research Compliance Services at ResearchCompliance@uoregon.edu or (541)346-2510.

Sincerely,

A handwritten signature in black ink that reads "Lizzy Utterback".

Lizzy Utterback
Research Compliance Administrator

CC: Howard Davis, Faculty Advisor

COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS • RESEARCH COMPLIANCE SERVICES
677 E. 12th Ave., Suite 506, 5237 University of Oregon, Eugene OR 97401-5237
T 541-346-2510 F 541-346-5138 <http://rcs.uoregon.edu>

An equal-opportunity, affirmative-action institution committed to cultural diversity and compliance with the Americans with Disabilities Act



Completion Date 27-Jul-2017
Expiration Date 27-Jul-2019
Record ID 23871158

This is to certify that:

Chelsey Luiz

Has completed the following CITI Program course:

Human Research
Social-Behavioral-Educational Researchers
1 - Basic Course
(Curriculum Group)
(Course Learner Group)
(Stage)

Under requirements set by:

University of Oregon



Verify at www.citiprogram.org/verify/?w174be4fa-82a4-49d0-8b55-ac8e66102264-23871158



UNIVERSITY OF OREGON

Release Form for Translators and Transcribers

Principal Investigator: Chelsey Luiz

Department: Robert D. Clark Honors College and the Department of Architecture, University of Oregon

Project Title: Architectural Development in Haiti: A Post Occupancy Analysis

I, _____, understand that as a translator/transcriber working for Chelsey Luiz with the research related questionnaires we conduct and record, I am required to maintain and protect the confidentiality of the information divulged by participants of the study. I agree not to disclose the information gathered during the questionnaire to anyone other than the principal investigator. I agree also not to disclose the identities and information about the identities of individuals who participate in the questionnaires.

My signature confirms that I will abide to this agreement, and that I will preserve the confidentiality of all proceedings, information gathered and transcribed, as well as the identities of participants in the study.

Signature: _____ Date: _____



UNIVERSITY OF OREGON

University of Oregon
College of Design & Clark Honors College
Consent to Take Part in Research
User Consent Group 1
Architectural Development in Haiti:
A Post Occupancy Analysis

Name of Researcher: Chelsey Luiz
UO IRB Protocol Number: 09112017.008

Introduction

- ☒ You are being asked to take part in research study that examines architectural development in Haiti
- ☒ This study is part of my coursework for my undergraduate thesis at the University of Oregon (UO)

Why have I been asked to take part in the study?

- ☒ Because you live or work on the site of the building (s) I am examining
- ☒ Because you might have an interest in sharing your thoughts and feelings about architecture

What do I do first?

- ☒ Before agreeing, please read this form.
- ☒ Please ask any questions that you may have

What is the Study about?

- ☒ How to better assist the Haitian people with the development of buildings in Haiti
- ☒ Ensuring buildings designed/built for Haitians by others are actually meeting Haitian needs, wants, and cultural standards

Who will take part in the Study?

- ☒ A maximum of 75 participants, including:
- ☒ Haitians who use the buildings being studied
- ☒ Any on site visitors using the building being studied
- ☒ The building owners or organization managers
- ☒ The architects, designers, and workers who took part in the design and building process

If I agree to take part, what will I be asked to do?

- ☒ Complete a questionnaire that lasts between 15-45 minutes.
- ☒ If you do not wish to answer a question, you can choose to skip

What are the risks of being in the study?

- ☒ There are no expected risks



What are the benefits of being in the study?

- ☒ There are no expected benefit

How will things I say be kept private?

- ☒ The records of this study will be kept private.
- ☒ In any type of report we may write, we will not include your name or anyone else's.
- ☒ Access to the research records will be limited to the researchers.
- ☒ However, sometimes, sponsors, funders, regulators, and the University staff who review research may have to look the research record

What if I choose to not take part or leave the study?

- ☒ It is not required that you take part in the study. At any time you are uncomfortable or would no longer like to participate, you may leave.

Who can I contact if I have any questions?

- ☒ You can email Chelsey Luiz who is the researcher in charge of this study. Her email is chelseyl@uoregon.edu.
- ☒ If you believe you may have suffered injury or harm from this research, call Chelsey Luiz at 541-733-8958. She will tell you what to do next.
- ☒ You may also contact professor Howard Davis, Faculty Advisor of Research, by email. His email is hdavis@uoregon.edu.
- ☒ If you have any questions about your rights as a person taking part in the study, you may call: Research Compliance Services at 541-345-2510 or email ResearchCompliance@uoregon.edu

Statement of Consent:

- ☒ I have read (or have had read to me) the contents of this consent form.
- ☒ I have been encouraged to ask questions.
- ☒ I have received answers to my questions.
- ☒ I give my consent to take part in this study.

Signature

Study Participant (Print Name): _____

Participant Sign Here _____

Date of Signature _____



UNIVERSITY OF OREGON

University of Oregon
College of Design & Clark Honors College
Konsantman yo Pran Pati nan Rechèch
Utilisateur Konsantman Gwoup 1
Architectural Development in Haiti:
A Post Occupancy Analysis

Chèchè: Chelsey Luiz
UO IRB Pwotokòl Kantite: 09112017.008

Entwodiksyon

- ☒ Ou yo mande yo pran pati nan etid rechèch ki examines devlopman achitekti an Ayiti.
- ☒ Etid sa a se yon pati nan travay mwen pou tèz bakaloreya mwen an Inivèsite a nan Oregon (UO)

Poukisa m'te mande yo pran pati nan etid la?

- ☒ Paske w ap viv oswa nan travay ou sou sit la nan bilding lan (yo) Mwen kap nan.
- ☒ Paske ou ta ka gen yon enterè nan pataje panse ou ak santiman sou achitèk

Kisa pou mwen fè an premye?

- ☒ Anvan dakò, tanpri li fòm sa a
- ☒ Tanpri mande nenpòt kesyon ke ou ka genye.

Ki sa ki se etid la sou?

- ☒ Ki jan yo pi bon ede pèp ayisyen an ak devlopman an nan bilding an Ayiti.
- ☒ Garanti bilding fèt / bati pa lòt moun aktyèlman satisfè bezwen ayisyen an, vle, ak estanda kiltirèl

Ki moun ki pral pran pati nan etid la?

- ☒ Ayisyen ki sèvi ak bilding yo ke yo te etidye.
- ☒ Nenpòt sou vizitè sit lè l sèvi avèk bilding lan ke yo te etidye.
- ☒ Mèt pwopriyete yo bilding oubyen administratè òganizasyon.
- ☒ Achitèk yo yo, desinateur, ak travayè ki te patisipe nan pwosesis la konsepsyon ak bilding nan

Si m'dakò yo pran pati, m'ap ap mande sa yo dwe fè?

- ☒ Ranpli yon kesyonè ki dire ant 15-45 minit.
- ☒ Si ou pa vle reponn yon kesyon, ou ka chwazi yo sote li.

Ki risk ki genyen yo pou yo te nan etid la?

- ☒ Pa gen okenn risk espere.



UNIVERSITY OF OREGON

University of Oregon
College of Design & Clark Honors College
Konsantman yo Pran Pati nan Rechèch
Utilisateur Konsantman Gwoup 1
Architectural Development in Haiti:
A Post Occupancy Analysis

Chèchè: Chelsey Luiz
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- ☒ Garanti bilding fèt / bati pa lòt moun aktyèlman satisfè bezwen ayisyen an, vle, ak estanda kiltirèl

Ki moun ki pral pran pati nan etid la?

- ☒ Ayisyen ki sèvi ak bilding yo ke yo te etidye.
- ☒ Nenpòt sou vizitè sit lè l sèvi avèk bilding lan ke yo te etidye.
- ☒ Mèt pwopriyete yo bilding oubyen administratè òganizasyon.
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Si m'dakò yo pran pati, m'ap ap mande sa yo dwe fè?

- ☒ Ranpli yon kesyonè ki dire ant 15-45 minit.
- ☒ Si ou pa vle reponn yon kesyon, ou ka chwazi yo sote li.

Ki risk ki genyen yo pou yo te nan etid la?

- ☒ Pa gen okenn risk espere.

Appendix B – Survey Questions – Example Questionnaire

Occupant Questionnaire

Guest House Staff

Institution: Chances for Children

Building name: Guest House

Date: _____ **Time:** _____

Introduction

We are conducting an evaluation of this building to assess how well it performs for those who occupy it. This information will be used to assess areas of building processes and design that need improvement, and will provide feedback for similar buildings and projects. Please note that any short answer responses may be quoted in the research report, but will remain anonymous.

Responses are anonymous. Please answer all the relevant questions.

Eligibility to Participate

1. Age

Under 18 years 18-30 years Over 30 years

2. Primary Language _____ **Secondary Language (if applicable)** _____

General

3. Gender (Please circle)

Male Female

4. Occupation (Please circle most relevant or state in 'other')

Staff Visitor Patient Other: _____

5. Design/Construction

- a. Were you here when this building was built? (Yes/No)
- b. If yes, were you part of the design or construction in any way? This includes being asked your needs, opinion or preferences by the designers. (Yes/No)
 - i. If yes, please specify:

6. Time in building

a. How long do you spend in the building during the day?
(Please tick)

Hours	>1	1-2	3-4	5-6	7-8	>8
-------	----	-----	-----	-----	-----	----

b. How comfortable is the space for the amount of time you spend there?

Not comfortable	1	2	3	4	5	Very comfortable
-----------------	---	---	---	---	---	------------------

7. Room Comfort

a. How comfortable are the spaces for the amount of people in each room?

Not comfortable	1	2	3	4	5	Very comfortable
-----------------	---	---	---	---	---	------------------

b. How comfortable are the sizes of each room? (i.e. is each room an appropriate size for its use)

Not comfortable	1	2	3	4	5	Very comfortable
-----------------	---	---	---	---	---	------------------

c. Is there anything about the space that makes you uncomfortable?

d. What things in the space make you feel most comfortable?

8. Overall Quality

a. Please rate the overall quality of the following areas:

<u>Guest rooms:</u>	Poor	1	2	3	4	5	Excellent
---------------------	------	---	---	---	---	---	-----------

<u>Kitchen:</u>	Poor	1	2	3	4	5	Excellent
-----------------	------	---	---	---	---	---	-----------

<u>Bathroom(s):</u>	Poor	1	2	3	4	5	Excellent
---------------------	------	---	---	---	---	---	-----------

<u>Group rooms</u> <u>/ living</u> <u>room:</u>	Poor	1	2	3	4	5	Excellent
---	------	---	---	---	---	---	-----------

<u>Work spaces:</u>	Poor	1	2	3	4	5	Excellent
---------------------	------	---	---	---	---	---	-----------

F. Other (Please state): _____

Poor	1	2	3	4	5	Excellent
------	---	---	---	---	---	-----------

b. How does this quality compare to similar buildings in Haiti you've been to?

Poor quality	1	2	3	4	5	Excellent quality
--------------	---	---	---	---	---	-------------------

c. Is there anything about the space that has a negative effect on your work performance (i.e. anything that makes it hard to get your work done)? Please specify.

Building Generally

9. Security

a. Personal safety: How safe do you feel in the building? (Please tick)

Unsafe	1	2	3	4	5	Very safe
--------	---	---	---	---	---	-----------

b. What aspects of the environment contribute to feeling safe? (Circle all that apply)

- i. Lighting
- ii. Security Guards
- iii. Gated property
- iv. List additional aspects here: _____

10. Finding Your Way (can you get into the building, can you get around the building/campus easily)

- a. How easy is it to get to the building from the street? (Please tick)

Very difficult	1	2	3	4	5	Very easy
----------------	---	---	---	---	---	-----------

- b. How easy is vertical circulation (stairways)?

Very difficult	1	2	3	4	5	Very easy
----------------	---	---	---	---	---	-----------

- c. How easy is horizontal circulation (hallways/corridors)?

Very difficult	1	2	3	4	5	Very easy
----------------	---	---	---	---	---	-----------

- d. Would you say the rooms are organized well? (i.e. rooms that are next to each other make sense - bathrooms by bedrooms, kitchen by eating rooms, etc.)

Not well	1	2	3	4	5	Very well
----------	---	---	---	---	---	-----------

11. Temperature

- a. Does the temperature in this part of the building have a negative effect on your work performance? (Please tick)

Not at all	1	2	3	4	5	Absolutely
------------	---	---	---	---	---	------------

12. Overall

- a. Does this building meet your needs? (Yes/No)
b. How much would you say you adapted this building to meet your needs?

Not at all	1	2	3	4	5	Completely
------------	---	---	---	---	---	------------

c. What needs can you identify that are not being met?

d. What needs can you identify that are being met?

13. Comments

If you have any additional comments that you would like to make about any aspect of this building environment, please note them here. If relevant to a particular question please give the question number.

Appendix C – Behavior Mapping

Behavior Mapping

Building: _____

Specific

Room/Space: _____ Date: _____

Time:

Observations:

Comments:

Appendix D – Physical Traces

Observing Physical Traces

Building: _____ Specific

Room/Space: _____ Date: _____ Time:

Observations:

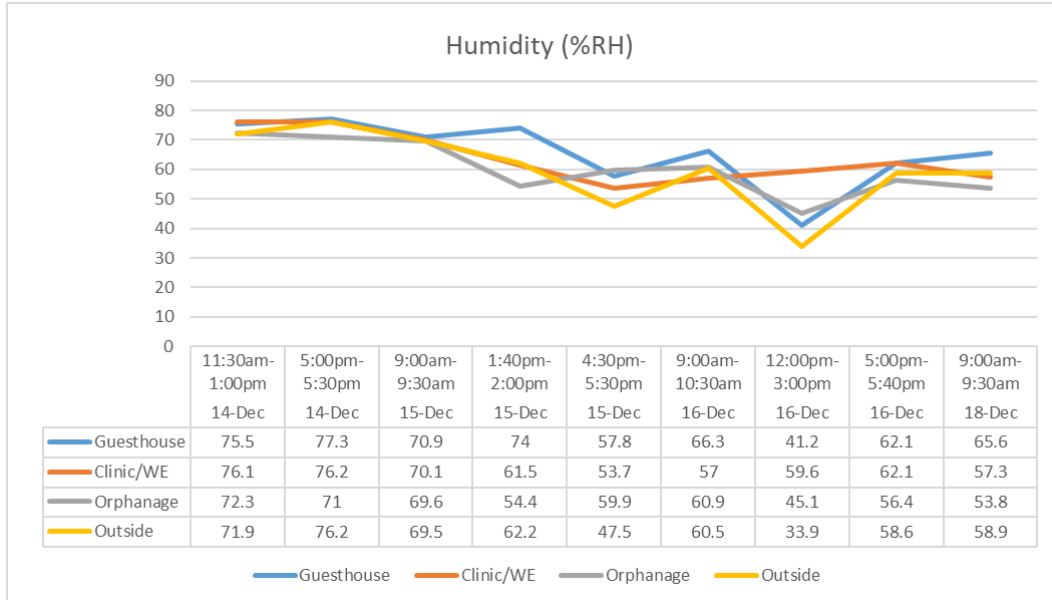
Comments:

Appendix E – Environmental Measurements

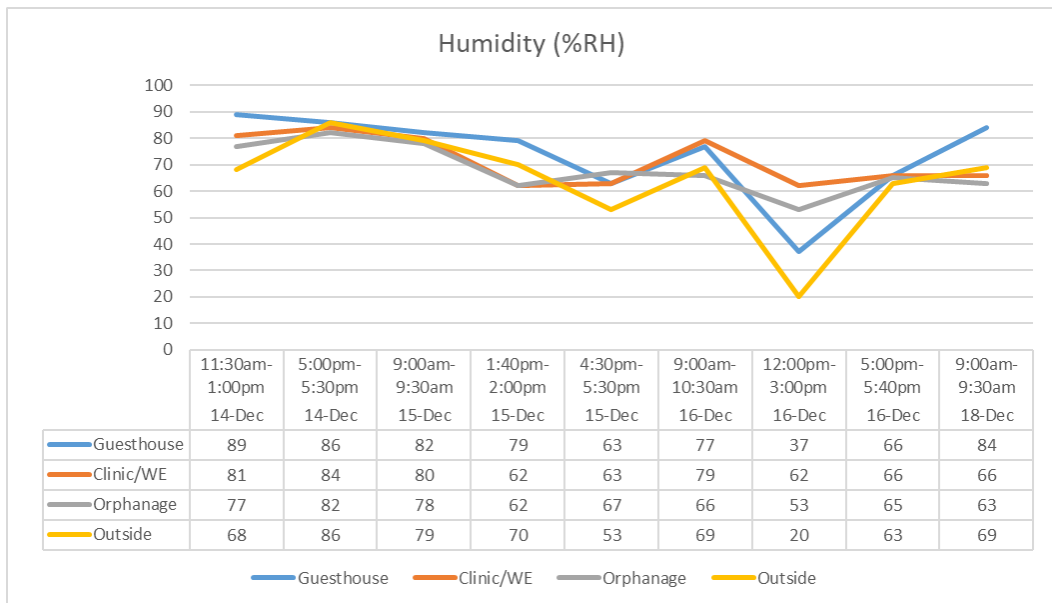
The temperature, humidity, and CO₂ levels in all three buildings and outside were also measured as part of this study. The measurements were conducted three times a day (morning, afternoon, evening) over the course of a four-day period. Two pieces of equipment were used for these measurements. One was a desktop TIM10 CO₂ Monitor that measures carbon dioxide levels, air temperature, and relative humidity. The other was a handheld Kestrel 3000, which measures many things, including wind speed, temperature, relative humidity, and dew point. The data collected from these measurements is shown in this section.



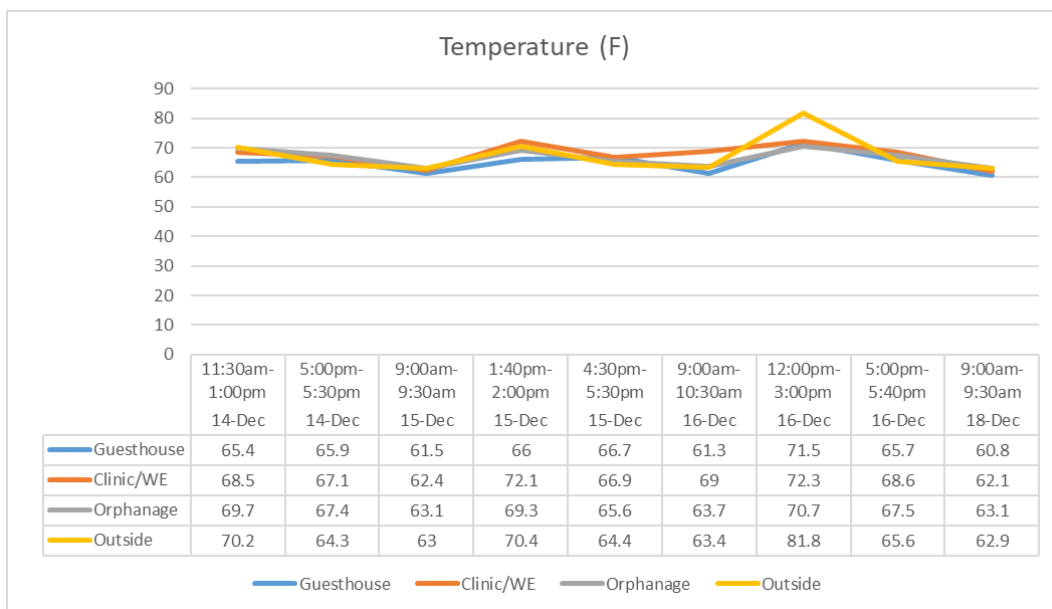
AZ-0004



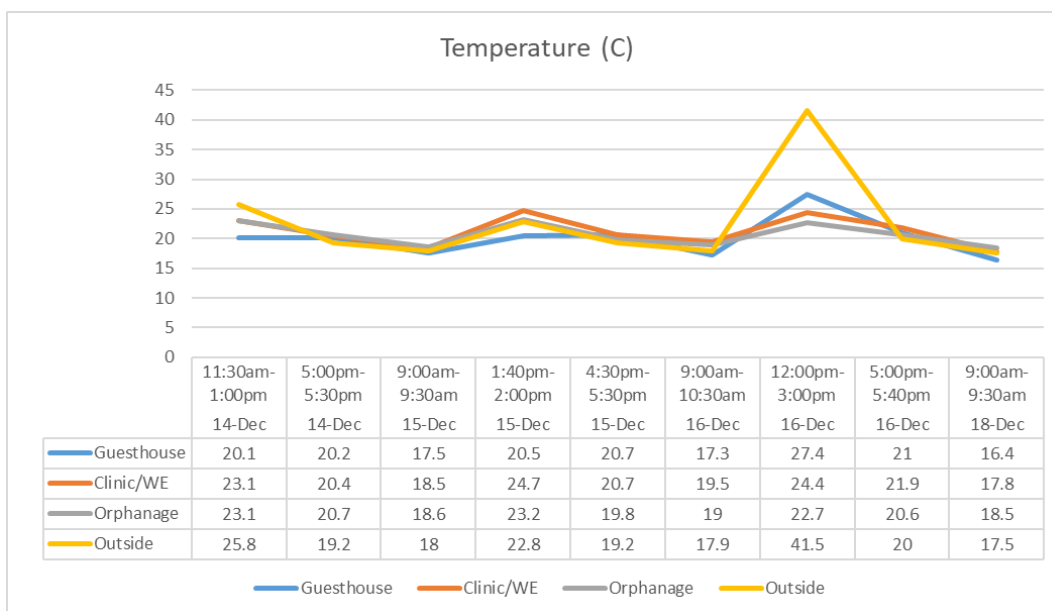
This data shown in this graph was collected using the Ketsrel 3000.



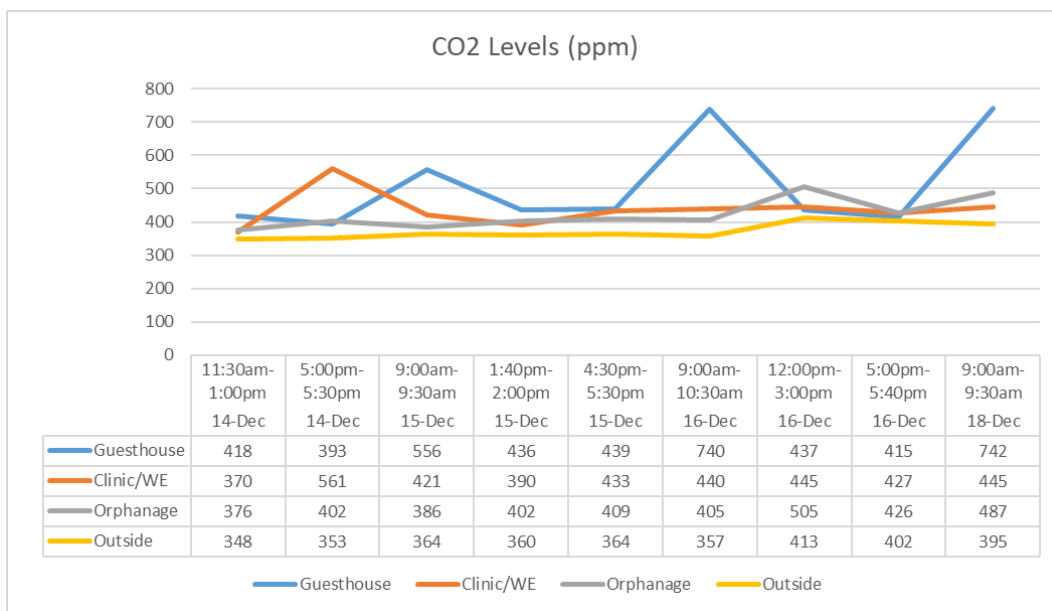
The data shown in this graph was collected using the TIM10 CO2 Monitor.



The data shown in this graph was collected using the Kestrel 3000.

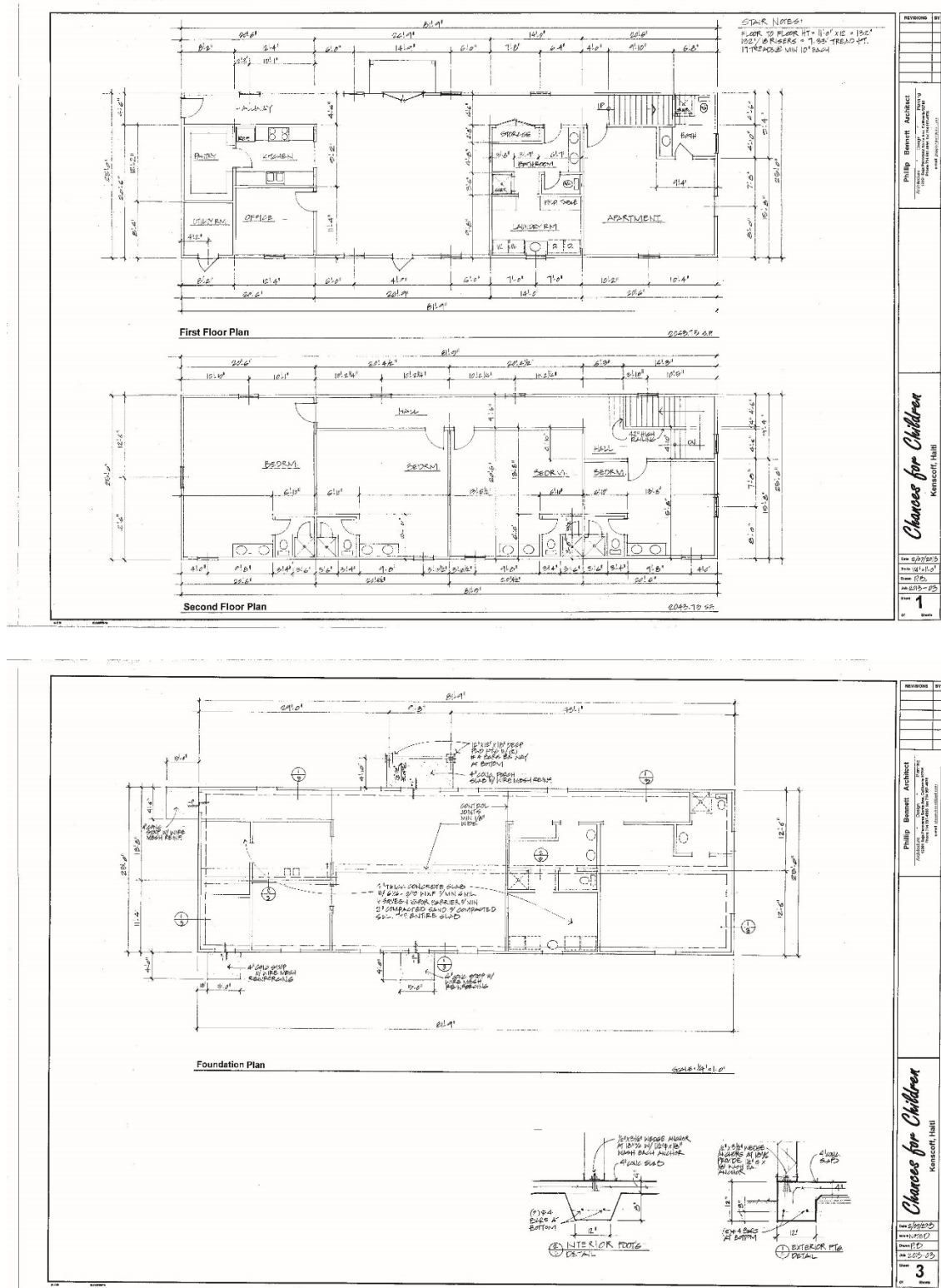


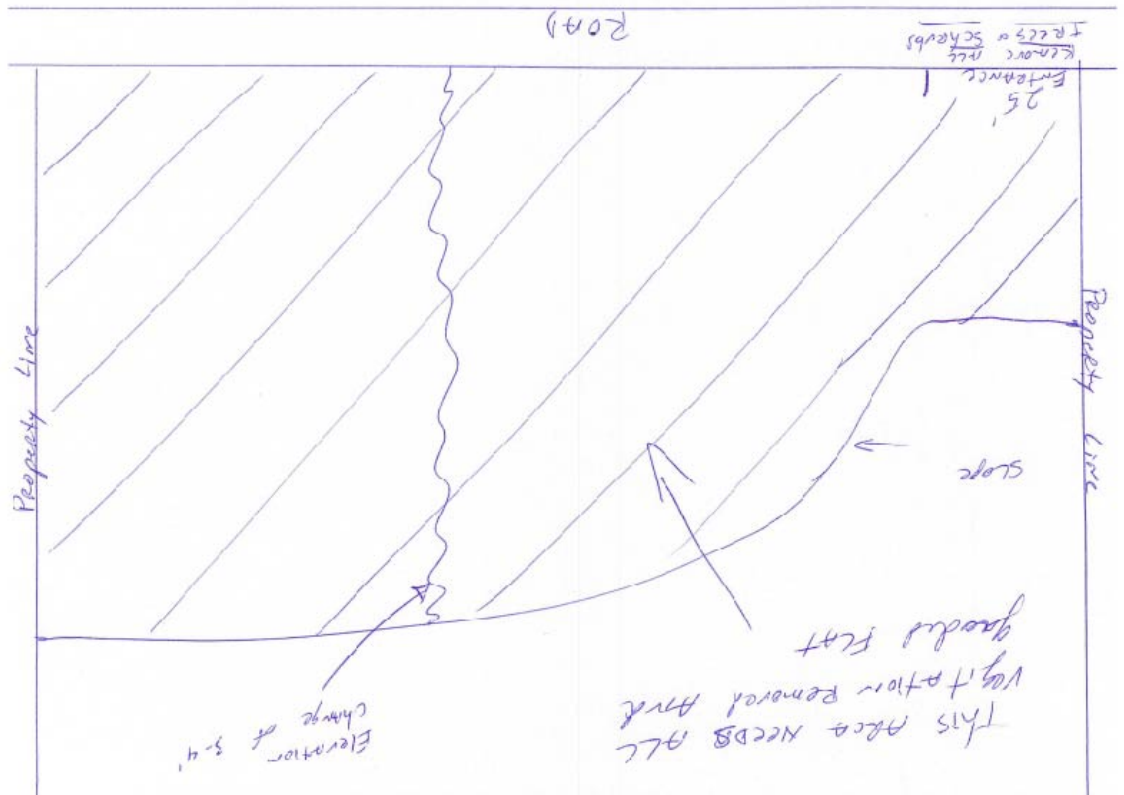
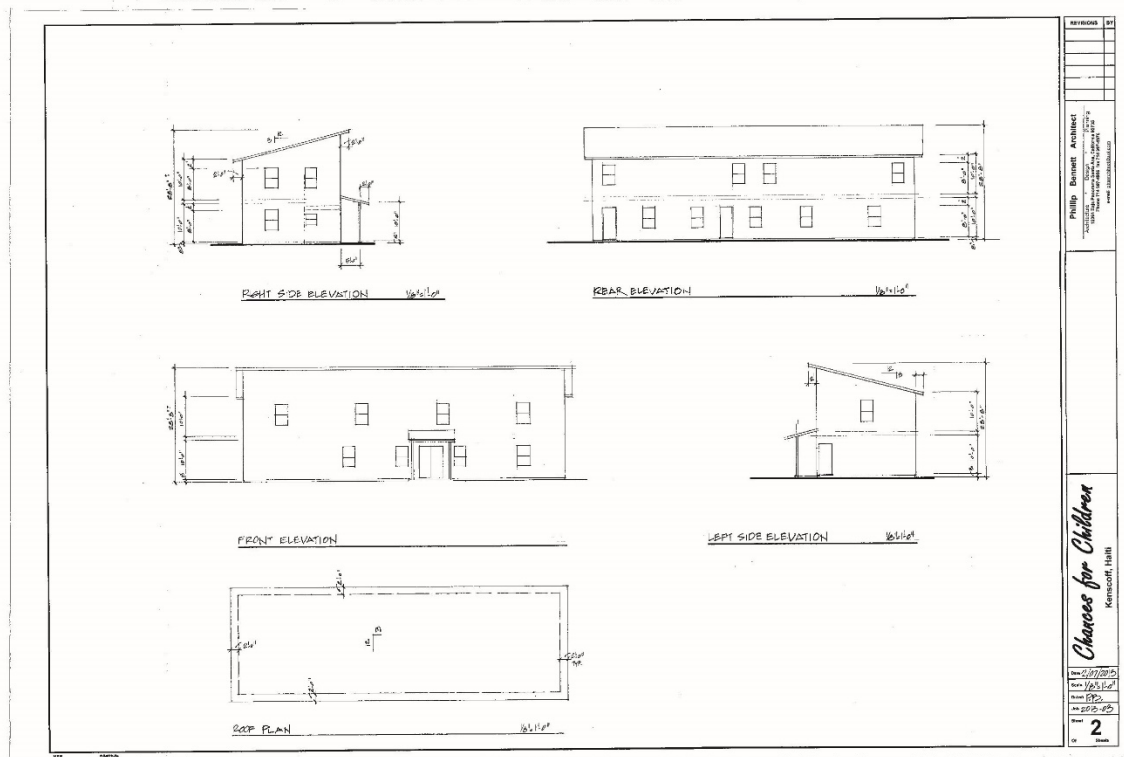
The data shown in this graph was collected using the TIM10 CO2 Monitor.



The data shown in this graph was collected using the TIM10 CO2 Monitor.

Appendix F – Orphanage Construction Drawings





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