[Re]Constructing Community:

A Strategy for Post-Disaster Recovery

A Thesis Presented for the
Master of Architecture
Degree
The University of Tennessee, Knoxville

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August 2015

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Acknowledgments

First of all, I would like to thank Professor John McRae for his direction and continued support as my primary thesis advisor. Without Professor McRae and his wisdom, this thesis would not have been possible. I would also like to thank Professor Tricia Stuth and Professor Jennifer Akerman for their guidance and advice as my secondary thesis advisors. I am lucky to have had such a committee. Additional thanks to David Perkes, Associate Professor for Mississippi State University and founding director of the Gulf Coast Community Design Studio, for his insight and consultation.

I am grateful for my education at The University of Tennessee and especially the College of Architecture and Design. I have had the benefit of learning from some of the most knowledgeable and talented professors. My experience at the University of Tennessee would not have been as rewarding without having the support of an extremely talented faculty.

Lastly, I would like to thank my fellow classmates in the graduate architecture program. I have learned so much from you and will take these friendships with me.

Abstract

This thesis focuses on exploring a viable solution for permanent housing after a natural disaster with an emphasis on community rebuilding in a southern coastal context. This region will continue to be affected by hurricanes and it is only a matter of time until another major disaster will happen. In any major disaster the fabric of the community is torn and takes a long time to recover. Communal places are vital to recovery after such disasters because they serve as a place where the people of the community can gather and provide support or receive support from each other and outside organizations.

In current disaster response strategies, establishing shelter immediately after such an event is paramount, while community rebuilding is given secondary importance. Current practices in the aftermath of natural disasters, while well intended, often turn into poor solutions. A "quick-fix" solution to this issue often leaves the community out of the equation, both its members and the sense of community. As a result there is too much focus on housing and community places are only addressed later in the recovery process.

Drawing from personal experience in the disaster recovery process post-Katrina, this thesis proposal challenges the existing disaster response strategies and focuses on simultaneous rebuilding of both housing and community places, approaching the problem of housing and community place as a synergetic issue. Housing is an integral part of a community, just as is community place, and by approaching the issue as if the two are one in the same, then community becomes the focus. A community is more than just its buildings, but its built environment provides a framework for community. By focusing on community rebuilding, both in housing and community space, the design solution will provide a greater quality of life for a community. The design proposal will have two aspects: housing and public community place. Both aspects will focus on community engagement and community rebuilding. The overall goal is to form a solution to reestablish the sense of community and address the need of adequate housing borne out through design.

Preface

Three Days Before Landfall

5:00 PM: Governor Barbour has declared a State of Emergency for Mississippi and Governor Blanco has declared a State of Emergency for Louisiana. The storm is expected to make landfall as a Category 3 hurricane.

11:00 PM: The center of landfall is expected to be either Gulfport, MS or New Orleans, LA.

School got canceled for Monday. I don't think it's that serious, but we'll see. School was canceled for a couple of days last year because of Ivan in Alabama, so maybe it's nothing more than a precaution. There's really no telling where it will hit for sure, but we'll stay here because a direct hit is unlikely and we've been through this before.

Two Days Before Landfall

4:00 AM: Hurricane expected to make landfall in New Orleans.

10:00 AM: Hurricane models show the storm becoming a Category 4 hurricane before it makes landfall.

5:00 PM: President Bush declares a federal state of emergency for the state of Louisiana giving FEMA the authority to provide aid.

Mandatory evacuation ordered for Hancock County in Mississippi.

News reports say it will hit New Orleans. That's' good for us except that we'll be on the right-front quadrant which gets the brunt of the storm surge and high winds. At least we won't be directly hit. Even though there is a mandatory evacuation, we will probably ride out the storm from home. They say we should expect high winds and a storm surge. We should be okay because we are 20 feet above sea level here and our neighbor says this area hasn't gotten any flood waters, even in Hurricane Camille. I expect we'll have a lot of downed trees and power outages, but we've been through this before.

Day Before Landfall

7:18 AM: The storm has moved over an area of higher temperatures and strengthened overnight and into the morning to a Category 5 hurricane with 160 mph sustained winds – gusts are up to 190 mph. Half of the Gulf of Mexico is covered by the hurricane. Areas along the coast of Mississippi and Louisiana should prepare for the worst. Storm surges of 18 to 22 feet expected – could surge up to 28 feet in localized areas.

Dad had to go into work this morning so I have to board up the windows myself. He is a director at the power company, but during hurricanes or large storms, is a manager of emergency operations for the power company. He said we should pack up the car as soon as we get the house boarded up and everything else taken care of. I can't believe how big the storm has gotten.

9:30 AM: Mandatory evacuation issued for Orleans parish, including the city New Orleans.

I know we need to leave but I want to know what it will be like here during the hurricane. I would hate to be in New Orleans right now though; if it hits them even indirectly, they say that the levees will break because they were only designed to withstand Category 2 or 3 hurricanes. Dad said to take pictures of the house, inside and out, for insurance reasons. He has to stay because he's in charge of a lot of the logistics at the power company during a major storm.

10:00 AM: Maximum sustained winds reach 175 mph. Hurricane force winds extend 105 miles from the center of the hurricane.

Dad just left for work. He gave me some money and the credit card and said to take of the girls (my sisters). We exchanged a hug and wished each other luck.

12:00 PM: President Bush declares State of Emergency in Mississippi and Alabama.

I just called my aunt who lives just north of Mobile, Alabama to let her know we are on the way. The traffic should be pretty heavy since everyone is leaving right now. I expect it's probably worse trying to go north, but since we're heading east it shouldn't be too bad. The biggest thing I'm worried about right now is that there is enough gas at this gas station. This line is getting longer and we've already been waiting for 20 minutes.

4:00 PM: All lanes of Interstate 55 and 59 in southern Louisiana and Mississippi are diverted to only allow traffic northbound for evacuation.

Traffic is a standstill and we're only half way there. Some people are pulled over in the shoulder and out of gas. A lot of people are out of their cars with them turned off just talking to each other. Everyone is giving their prediction of what will happen and how the hurricane will affect us. As we sit in the parked car on the interstate near the Alabama border, dark clouds are starting to roll in. They are part of the outer bands of the rotating storm. I hope we get off the road before we catch the edge of the hurricane. We have had to evacuate before, but we've never been through this before.

Landfall

6:10 AM: The hurricane has reduced to a strong Category 3 storm with 125 mph winds as it is making landfall in Plaquemines Parish.

I just woke up from the TV report. It just made landfall in Louisiana. It has been raining on and off all night and getting stronger. The trees outside are swaying more and gusts seem to bring more rain with them. We are nearly 150 miles east of the eye of the storm and we are still feeling hurricane gusts.

10:00 AM: The eye wall is nearing the northern Gulf coast at the Louisiana - Mississippi border – winds at 121 mph.

Winds are really picking up here. Two trees have fallen just down the street and the rain feels like little water bullets. I have been texting my friend whose family stayed in Mississippi just about a mile off of the coast. Around 8:00 she said that it was starting to flood and that the water was nearing her front door. She said it was really windy and raining more than she had ever seen. I'm starting to get nervous our house might actually flood too.
I just got a text message from her saying the water is almost the to the window sill.
She hasn't sent me a text message in the past 20 minutes. I really hope she's okay.
The eye of hurricane just made landfall in my hometown.

The Aftermath

The last few days have been a blur. Power has been out since the hurricane made landfall in Mississippi, but luckily we have a generator. At night we have been huddling around the TV trying to find out how the Mississippi coast has fared. The only thing the news stations will show is New Orleans. We have no clue about Mississippi. Supposedly there is a no-fly zone over the Mississippi coast due to "continuing rescue operations." We have seen no footage of the destruction in Mississippi, but New Orleans looks horrible: people on roofs waiting to be rescued, fires burning in the distance, people stranded at the Superdome.

I just got off of the phone with my dad. It was good to hear from him since we've had no contact since cellular towers went down when the eye wall made landfall. Someone from FEMA let him use a satellite phone to call us. FEMA in that area has been working at the power company building because it was the only major building that did not flood. He said the damage was beyond belief. I told him about some of the rumors I heard from TV or from some of my friends – about the amount of destruction and the dead bodies. All he said was, "It's horrible. This is like nothing that has ever happened in the United States. It is the worst natural disaster in US history. It might be a while until you can come home. You should sit tight there. Don't worry about coming home for now."

All I want to do is to go home. My dad said he can't even get to our house because of all the downed pine trees blocking the road. I want to do something to help. I am just sitting here doing nothing.

NYPD in Mississippi

Black Hawk helicopters are flying overhead, heading west just like me. I'm heading home for the first time since the hurricane made landfall. Next to me is a fleet of power company trucks from Brooklyn, New York. It makes sense I guess. My dad said the entire power grid from the coast inland over 50 miles was completely destroyed. It will take a lot of people, more than the local power companies, to rebuild it. As I get closer to home I see more and more pine trees snapped like tooth picks. Some are in pockets, completely snapped with others right next to them completely fine. I just saw a billboard bent in half. It must be where one of the tornadoes touched down.

I can't believe my eyes. Everything is destroyed. I saw some of the imagery on TV but it is some much more real in person. There are upside down cars. A house is sitting just off the road, the other half still on the foundation more than 100 feet away. There are so many trees down. I am coming up to what I was told was the first checkpoint. The National Guard has armed guards at checkpoints. I am not sure if it is for security or what, but they ask for ID and interrogate the reason for driving into the city.

I just left my friend's house. Luckily the water did not get higher than the windows and her whole family was okay. She invited me to eat lunch there. The only thing on the menu was water and MREs. Just before lunch, though, I surveyed the damage along the beach. The entire beach road is washed out. Sewer lines from the previous century are standing on end out of the ground where the road was. Most of the buildings along the beach are completely gone, no trace besides the slab. Other buildings were somehow not completely washed away but one is literally cut in half – with dining settings still on the teetering table. At my high school there are cars on top of other cars sticking out of the building. The highway bridge over the bay is completely destroyed – only the pilings are still standing. There is a portable cellular tower there and many people are around it on their cell phones, letting friends and family members know of their situation, while an NYPD truck patrols the area.

I have only been able to get in touch with a few of my friends. I think everyone is okay because I believe most of them evacuated, but there is no telling for sure. Being that this is my senior year in high school, I might never see some of my classmates again. The only place anyone can really get information about friends and family whereabouts is through online forums. Right now there really isn't anywhere for people to reconnect with each other. Everyone's lives have just been uprooted. Nearly every house in the city is damaged from the flood waters, most along the beach completely destroyed. I have heard of so many people saying that they are not coming back. I can't blame them completely. Everything is destroyed beyond imagination. It will take years for this area to look any bit like it did before.

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Section 1:
Introduction

The notion of community is a core aspect of this thesis. Our understanding of the term "community" is often conveyed in a generalized way and not given a clear definition; it is a loaded term with far-reaching connotations. Social anthropologists and sociologists have defined "community" in many ways and there are many facets of the term. According to Peter Willmott, a distinguished British sociologist and co-founder of the Institute for Community Studies, community can be understood in three ways: a community of common place, a community of common interest, and lastly the "spirit of community" (Crow & Allen 1994). In this text, community is both the built environment of a geographical area – community of common place, together with the people who live within it: it is a collection of individuals acting as a greater whole who share a common thread – community of common interest. There are basic needs that are to be met for a community to exist, and for this thesis, the following needs of a community will be addressed: basic shelter needs, service and amenity needs, and life quality needs.

On August 29, 2005 my community was destroyed. I saw firsthand the immense power of the most destructive natural disaster in the history of the United States. Entire communities were destroyed and thousands died in a matter of hours. The loss of community was the second greatest loss beyond the loss of lives. The rebuilding still continues nearly a decade later and there are many lessons to be learned from such an event and the response that resulted. One such lesson is the importance of community places. In the recovery process post-Katrina, the focus on community places seemed to be a second thought. Obviously housing is an important issue to resolve, but community places are arguably just as important. While it is earnest to focus on housing, a fast response inadvertently ignores a deeper understanding of community rebuilding. Public community places are a key part of the recovery process which offers a place for the community to gather and support each other. Together with housing, community spaces provide the built environment which communities exist within. It is too shortsighted to focus on only housing or only community spaces after such a disaster though. We must realize the importance of rebuilding the two aspects of the physical community framework at the same time in the Recovery phase (Figure 1). By approaching the issue of community and housing as one in the same, this allows for the intangible aspects of community to recover.

Disaster response strategies in community rebuilding are important issues to research because, if history is any indication, natural disasters will continue to plague the United States, especially coastal areas – as seen in Figure 2. This thesis will focus on one region, the southern coastal region of the U.S., but more specifically one community in the southern Gulf Coast region. The strategies proposed in this text, however, are intended to be applicable in other coastal contexts. The southern Gulf States are blessed with white sand beaches and an expansive coastline. This also means that the southern Gulf States are open to storms from the Atlantic and the Gulf of Mexico. Not only is this area vulnerable to storms but has a large population. 37% of the population of the Gulf States lives in the Gulf Coast Region (NOAA 2011). This area is also projected to increase in population. There is an expected 15%

increase in population in the Gulf Coast Region by 2020, compared to an 11% increase in total U.S. population in the same time period (NOAA 2011). Not only do a large majority of people live in this region, but also hundreds of communities. More disasters are inevitable and so is the process of rebuilding. There is not only an opportunity to rebuild better, but a responsibly. We must rebuild in a more informed way, focusing on the synergetic relationship of housing and community places.

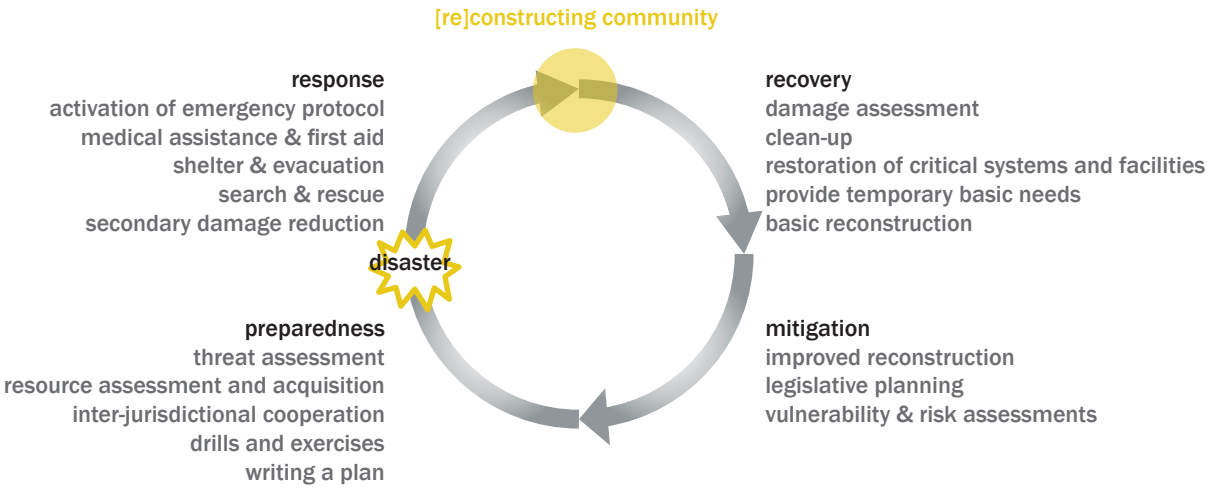


Figure 1. The Four Phases of Emergency Management (author, based on Jackman et al. 2013)



Figure 2. Major Hurricane History, Category 3 and above (Tropical Cyclone Climatology 2014)

Section 2:
Current Recovery Strategy

Current disaster response strategies in the United States are based on the Four Phase Emergency Management model as seen in Figure 1 (Jackman et al. 2013). This model is comprised of preparedness, response, recovery, and mitigation and stems from a 1979 report by the National Governor's Association which defined this scope (Jackman et al. 2013). The model has evolved overtime and the latest version, being that of the Federal Emergency Management Agency (FEMA), was adopted in 2012 (Jackman et al. 2013). In this model preparedness is defined as planning, training, exercising, and organizing "to build, sustain, and improve operational capabilities" (Jackman et al. 2013, 58). Following the preparedness phase, the assumed disaster occurs. After the disaster the response phase begins. It is in this phase which immediate efforts are made to "save lives, protect property and the environment, and meet basic human needs" (Jackman et al. 2013, 58). In the recovery phase the re-establishment of government services and operations, housing programs, "social, political, environmental, and economic restoration," and cleanup take place (Jackman et al. 2013, 58). The providing of basic needs and the beginning of reconstruction also occurs in this phase (Jackman et al. 2013). This is the phase in which a community begins to rebuild in the short and long term, and depending on the severity of the disaster, this phase can take many years while the mitigation phase begins. The mitigation phase is basically a period where efforts are made to reduce the amount of damage of a future disaster. In the mitigation phase improved construction and reconstruction occurs (Jackman et al. 2013). In summary the Four Phase Emergency Management model consists of preparing for a disaster, responding to immediate needs post-disaster, recovering from the disaster, and finally establishing a safer environment in the chance of another disaster.

This thesis proposal is positioned in the recovery phase. In this phase there is currently much attention in short-term recovery. This is the phase in which relief organizations such as the Red Cross and other non-governmental organizations (NGOs) as well as FEMA provide most of their support to communities. One of the first and most obvious issues to address



Figure 3. Navy Seabees remove debris in Biloxi, MS after Hurricane Katrina (Richards 2012)



Figure 4. American Red Cross provides meal service after Hurricane Sandy (Richards 2012)

is the loss of housing. Because housing units are not available immediately after a disaster due to their pre-staging at a location far enough away from the disaster area, survivors rely on family members or other members of their community to help provide temporary housing. Shelters are coordinated for those who do not have a place to live. FEMA provides temporary housing support through its Individuals and Households program to qualifying disaster survivors (FEMA 2014). This support is primarily provided through rental assistance by providing funds to survivors, but if FEMA determines the need for temporary housing due to the lack of housing stock available for renting, they provide Manufactured Housing Units (FEMA 2014). After roads have been cleared of debris and electric power restored, temporary housing units can be delivered to various sites.

Government organizations and NGOs provide much of the temporary housing needs as well as the restoration of basic infrastructure needed for daily survival. This includes providing adequate food and water and basic-needs items. After a disaster many items such as toiletries, blankets, clothing, and school-related items are donated to the affected individuals. NGOs provide distribution centers for these items as well as others. These centers sometimes act as outreach locations where affected individuals can receive counseling or at least be informed of counseling services.

After short term recovery operations have been completed, such as cleanup, the establishment of temporary housing, and repair to infrastructure most NGOs move out. This is the point where the rest of the recovery process is generally passed onto the community. Government organizations, such as FEMA, continue to provide support for a given time based on the community needs, but it too phases out its support. It is then up to the community to decide what its needs are and how it can address them.



Figure 5. Hurricane relief center in Queens, NY after Hurricane Sandy (Lane 2012)



Figure 6. Workers replace utility poles in Miami after Hurricane Katrina. (Lee 2005)

Temporary Housing Types

As previously stated, temporary housing is the greatest focus after the initial response. Until recently, FEMA relied on three types of housing units as seen in Figures 7 through 9: the travel trailer, the park model, and the manufactured housing unit (Office of Inspector General 2013). These temporary housing units are placed at three different site types: private sites, commercial sites, and group sites (Office of Inspector General 2013). In 2011 and 2012 respectively, FEMA announced that the agency would no longer support the use of travel



Figure 7. Travel Trailer (Armstrong 2010). Travel trailers provide temporary living conditions and are intended for recreational uses and are not regulated by HUD (Office of Inspector General 2013). Typically these units contain a small kitchen, bathroom, dining area, sleeping areas, and storage, and dimensions vary based on manufacturer.



Figure 8. Park Model (Shapira 2008). These units are designed for temporary living, but are not regulated by HUD (Office of Inspector General 2013). Similar to travel trailers, these contain all the amenities needed for living, but can be larger - 12 feet wide and 33 feet long (Office of Inspector General 2013).



Figure 9. Manufactured Housing Unit (Office of Inspector General 2013). Manufactured Housing Units are the only temporary housing units regulated by HUD (Office of Inspector General 2013). Models provide either one, two, or three bedrooms and range from 12 to 14 feet wide and 40 to 60 feet long (Office of Inspector General 2013).

trailers and then the park models, thus making the manufactured housing unit the only supported temporary housing unit (Office of Inspector General 2013).

Temporary Housing Sites

There are three types of sites which FEMA positions housing units: private sites, commercial sites, and group sites (Office of Inspector General 2013). For private sites, if the family or individual owns the land which their house was situated and has the available space, a housing unit can be positioned. For those who do not own property or rent, FEMA establishes temporary trailer parks at either commercial sites or group sites. At commercial sites, FEMA places units on existing campgrounds or commercial trailer parks which have the existing infrastructure to accommodate these units (Office of Inspector General 2013). Group sites are similar to commercial sites, yet these sites must be built from scratch, including all needed utilities.

After Hurricane Katrina, The Federal Emergency Management Agency purchased 145,000 trailers to be used as temporary housing (Hsu 2010). These temporary housing units were provided to those whose residences were damaged and meant to be lived in only temporarily - for a period of 18 months (Stuckey 2005). After the 18 month period the trailers were to be removed by officials. The majority of FEMA trailers were positioned in two major methods depending on the situation of the residents who would live in them. The first method was to deliver the trailer directly to the site where the resident lived as seen in Figure 10 - the private site. This was the most common method for homeowners. The trailer would be connected to existing services (i.e. electrical power, sewerage, and water) at the home of the resident. The second method of FEMA trailer organization was to deploy multiple trailers to a single location or a group site. Areas of land were leased by FEMA and multiple trailers were positioned at these sites as seen in Figure 11. Generally, these sites did not have existing services immediately available, but rather had to have new power, sewage, and water lines installed for each trailer. This method was established for renters, non-homeowners, or homeowners without a suitable site.



Figure 10. FEMA Trailer at Private Site (Threlkeld 2009)



Figure 11. FEMA Group Site (Associated Press 2010)

While the methods of FEMA trailer deployment were well intended, each had positive and negative aspects. The trailer-at-residence, or private site situation allows for the homeowner to live basically adjacent their home while they continue to rebuild or repair it. This also allows the homeowner to maintain security of their home while under construction, making the homeowner less susceptible to theft. Separate from a logistical point-of-view, being near the home allows the residents some sense of normalcy. In an area that has been devastated, being close to home can provide some comfort. Aside from actually being back in the home, the trailer-at-residence situation is the closest to returning to a previous living condition. However positive these aspects are, there could also be downsides. Being able to live close to the original home allows the residents to focus on their own situation, which is needed for recovery, but too much inward focus could blind them to the needs of the greater community. The second method of trailer deployment has positive aspects in that it provides housing for those who do not own land or their own home. The issue that arises with multiple units in the same location is that they are generally organized in a way to maximize the number of units per area of land. This configuration leaves trailers cramped on site and reduces privacy. Having to construct new infrastructure is another issue with this method. After the trailer park has served its needs, it is deconstructed and the infrastructure (sewer, power, water) must be removed. This can not only be costly but also inefficient. According to a report by the Office of Inspector General of Homeland Security, placing trailers at group sites cost from $69,000 to over $220,000 per unit, including site improvements (Office of Inspector General 2013). Comparatively, the price to place a trailer at a private site, as in the trailer-at-residence situation, is $33,000 (Office of Inspector General 2013). The group-site method of deployment is also criticized due to the location of these sites. Generally the sites were not located near the residents' previous location, and could be problematic being far from schools, places of work, and accustomed surroundings (Hollingsworth 2013).

Section 3:
Precedents

The following research is an investigation into projects which can inform a design solution. The precedent research covers previous projects in housing, community space, services, and materials research. By understanding these projects, both the positive and negative aspects, a well-informed design solution can take advantage of the previous work of others.

39571 Project and InfoWash
SHoP Architects and Parsons Design Workshop
DeLisle, MS

The 39571 Project and InfoWash were the first community oriented projects designed and built after Hurricane Katrina in DeLisle, MS. Beckoned by local resident, Martha Murphy, SHoP arrived in Mississippi just weeks after Katrina made landfall. SHoP understood the need for a place to house emergency supplies and food, but also the need for community gathering place as well. As Murphy said, “The first thing I realized after the storm is that a community is not its buildings; a community is something different and more. But the second thing I realized is that buildings help define a community and they add dimension to is activities” (Cary 2010, 70). As part of the project, SHoP Architects designed a community center with nonprofit office space, a business incubator, and a café. The community center is actually two separate buildings connected by a covered porch. Parson Design Workshop designed a laundromat and more offices. In total the two groups built over 13,000 square feet of community focused spaced for the people of DeLisle (Architecture 2012).

The ability for a firm to come in, design, and build a project in the circumstances that they were faced with is an impressive feat. A lesson learned from this project is the importance of the community to the community. SHoP could have focused on rebuilding housing – an obvious need at the time – but they saw the value and importance in building a community center. The major aspect of the project was its ability to adapt its functions. The functions of



Figure 12. 39571 Project by SHoP Architects (Open Architecture Network 2012)



Figure 13. Infowash by Parsons Design Workshop (Chabra & Lyon 2006)

the center were closely matched to the needs of the community at a given time. Providing such flexibility was important because the needs of the community change over time during the rebuilding process. Another positive aspect of the project was the focus on covered outdoor space. This matches the functions of both the vernacular porch of the region, but also shades the buildings. Lastly, beyond functionality, the project held community involvement in high regard – not only in the design phase, but in the life of the project. Having community input is important in any public-oriented project, but exceedingly so in a community that is redefining itself after disaster.

ecoMOD2
John Quale and UVA students
Gautier, MS

The ecoMOD2 project is focused on modular, prefabricated construction and was implemented in Gautier, MS. The project is based on John Quale's work at UVA School of Architecture and the school's ecoMOD design/build/evaluate project in central Virginia. After Katrina, Quale focused his design efforts on the Gulf Coast to respond the housing loss. According to the program's website, "ecoMOD/ ecoREMOD is a research and educational project at the University of Virginia, striving to create sustainable modular and renovated housing units for affordable housing organizations" (EcoMOD). The UVA team started ecoMOD2 to design a house for Habitat for Humanity of the Mississippi Gulf Coast. The resulting project designed by the ecoMOD2 team was the preHAB house which was shipped to Gautier as a "flat-pack panelized home" (Quale 2008, 101). The prefabricated house totaled 1,087 square feet with three bedrooms. Energy efficiency was key to the house design, focusing on passive strategies such as natural ventilation and thermal efficiency.

The project team sought to incorporate the vernacular, and with covered porches and outdoor space around the perimeter of the house. These elements also provided shading as a passive strategy. Also, the future owners of the preHAB house were required to put in "sweat equity" as part of Habitat for Humanity's mission, giving them a personal stake in the project.

There are many positive aspects that can be learned from the ecoMOD2 project. After such a large scale disaster, the procurement of materials and resources is uncertain. By using a panelized construction technique, the ecoMOD2 project allowed for panels to be prefabricated outside of the disaster area and to be shipped to the site. This technique allows for fast assembly of the house and provides an opportunity for members of the community to be part of the construction process – much like the Habitat model. The team found that they should have simplified the design somewhat so the house could be more easily assembled by the community; however, choosing a construction process that the community could be part of was a good way to help the community help themselves. The ability to be part of the construction of your own home or the home of a friend or even a stranger is a rewarding deed and connects you to the community in a deep way. The "sweat equity" model used by the ecoMOD2 team reinforces this value and insures that the owner is invested in their

future, not just taking a hand-out. When most people have lost most of their belongings and are weary about their financial future, affordability is a must. The group strived to make an affordable, cost effective house, and at approximately $65 per square foot, the house was a way to demonstrate good design can be affordable (Quale 2012). Another positive aspect of the project was its energy efficiency and its use passive design strategies. Again, related to affordability, energy efficient design helps reduce energy costs to the homeowner, but also demonstrates the importance of environmental responsibility. Quale did not mention it is the referenced works, but a vernacular coastal house design is that of the shotgun house. Just like the ecoMOD2 project, this design allowed for cross ventilation – a must in a southern coastal context when air conditioning is not used. And lastly, the importance of addressing the vernacular was a positive aspect of the project. When people are rebuilding their communities, they normally would like to rebuild their environment in a way that can be familiar to them. This is not to say that we must rebuild a community to make it the same as before, but rather build back in more informed, culturally aware, and sustainable way.



Figure 14. ecoMOD2 | preHAB by UVA (Ecomod 2010)



Figure 15. ecoMOD2 | preHAB rendering by UVA (Ecomod 2010)

The Biloxi Model Home Program
Parker Residence design by Brett Zamore Design
Nguyen Residence design by MC2 Architects
Tran Residence design by MC2 Architects
Desporte Residence design by CP+D Workshop
Robinson Residence design by Huff & Gooden Architects
Tyler Residence design by Marlon Blackwell Architect
Odom Residence design by Gulf Coast Community Design Studio
East Biloxi, MS

The Biloxi Model Home Program is a program that provided “design services and financial assistance for the construction of homes for families in Biloxi, Mississippi whose houses were destroyed by Hurricane Katrina” (Biloxi 2014). It provided a “one-stop-shop” for residents to get architectural, construction, financial aid, and legal services. The program also

focused on sustainable building techniques, materials research, and disaster mitigation. There was not a single design solution, but many provided by five different architecture firms or organizations.

One of the most important aspects of the program is that it did not prescribe a universal design for the families involved, but provided one-on-one consultation with design professionals. As the program describes itself: "This program approaches reconstruction in a mode that facilitates good design solutions by standardizing processes and partnership strategies as opposed to standardizing design" (Biloxi 2014). Standardized design is less personal, even if it is initially more cost effective. A lesson learned from the program is that we must provide not one single design solution, but allow for many.



Figure 16. Parker Residence by Brett Zamore Design (Architecture for Humanity 2014)



Figure 17. Cong Nguyen in front of his house (Open Architecture Network 2012)

Make it Right
Multiple Architects
9th Ward – New Orleans, LA

Make it Right is a housing program led by actor, Brad Pitt to rebuild housing in the lower ninth ward in New Orleans, LA. The goals were to build 150 homes designed to "sustain natural disasters" for former residents (Vinnitskaya 2013). The houses are to be affordable, safer – storm and flood resistant, and sustainable – LEED Platinum (Quirk 2013). There is some controversy concerning the project, the result of many of the housing designs not being of the contextual vernacular. Other issues have arisen such as the lack of amenities for the community. Houses were built, along with a playground, and community garden, but not much more. In all 100 houses have been completed with others on the way.

Although the celebrity connection to the Make it Right program helped to catapult the need for assistance post Katrina into the American public's psyche, there were many shortfalls. The project was critiqued for many reasons, but one was placing more value in LEED Platinum certification over affordability. It must be understood that it is important to build sus-

tainably, but not at the cost of only being able to rebuild only a small fraction of the homes destroyed. On the other hand, however, building sustainably can be achieved in an affordable manner and it must be a priority in rebuilding a community. A lesson learned from Make it Right is that a solution must not only be sustainable, but attainable. Also a solution must provide amenities for the community beyond just housing. A community is more than its houses and solving only that part of the problem does not solve the larger issue.



Figure 18. Flood-damaged house in the Lower 9th Ward, New Orleans (Vinnitskaya 2013)



Figure 19. Make it Right House by BILD Design in the Lower 9th Ward, New Orleans (Vinnitskaya 2013)

Alternative Construction Research Guide
Gulf Coast Community Design Studio
Mississippi Gulf Coast

The Alternative Construction Research Guide is a project sponsored by Mississippi State University College of Architecture, Art, and Design with the GCCDS, created in response to Hurricane Katrina. It is a report that investigates alternative construction methods for residential construction. The report researches installation, performance, design, and Gulf Coast availability/ local manufacturers with each construction strategy or material. The result is a comprehensive report that details various residential construction strategies and provides the positives and negatives of each.

There are many ways to construct a house. How do you decide which way is best for you? The Alternative Construction Research Guide provides solid research on construction methods and materials, both traditional and innovative. Having such a resource is extremely important to a community that is striving to not only to rebuild, but to build better.

Section 4:
Proposal

Community places are a key aspect of the recovery process. Communities have certain needs, such as basic shelter needs, service and amenity needs, and life quality needs. This proposal will strive to provide a designed solution for each of these needs and will test a these in a southern coastal community. Bay St. Louis, Mississippi will be the backdrop of this investigation because Hurricane Katrina devastated this city when the eye of the storm made landfall there in 2005. The recovery strategy will be implemented on a site in Bay St. Louis and will assume 2005 as the year at which the strategy begins.

The solutions investigated there should not focus only on housing or only on community space, but consider the two as one synergetic entity. In the recovery phase much effort goes into establishing housing and basic needs, however, the importance of community space is an oversight. The intangible support that a community provides is a basic need; it is a life quality need. A solution should be flexible to meet the needs of the community as it recovers.

In the initial stages of recovery a community place can provide many functions; one being a logistical function and the other a psychological function. When tons of donated materials arrive in a disaster area, they need to be housed in some way. A community place, such as a community center, can provide this as well as a point of distribution. This distribution point does not only provide a place to distribute goods, but also information. After a disaster there are many unknowns. A center such as this could be a place to share information and provide a place for the community to gather. Food is another aspect that brings people together. The community center can serve as a place to serve hot meals. This is important because it provides a place where all members of the community can gather – the rich and the poor, the young and the old, and those of different races – for one purpose – to share a warm meal. This also satisfies one of the other functions of such a community place – that of a psychological function. A disaster has profound effects on those that lived through and continue to live through it. A community gathering place allows for the members of a community to receive and give support to each other. It provides a place of mental refuge. It allows for an escape where community can distance themselves from the destruction, stress, and disorder of their environment.

In the later stages of recovery, as the community begins to rely less on immediate needs, the community center can transform its functions to meet the other needs of the community. A distribution center will no longer be required and the space can serve other functions. One function could be that of a business incubator. When a disaster occurs it greatly affects all aspects of a community, including its economy and businesses. A business incubator could provide a business a place to start or restart. It helps meet the needs of a recovering small economy. As the community continues to recover, to a point enough to have disposable income again, the center could use the existing food preparation equipment for a café or restaurant. This provides the final need of a community – the life quality need. It would serve as the same function as it did when serving hot meals, but now it also provides economic support. As more businesses recover, the economy of the affected area will also recover.

These new functions continue to provide a place of community interaction.

It should be understood that this center is not thought of as a standalone building, but part of a complex of community space. Housing must involve communal aspects. One aspect being that the housing should be intergenerational and should also be diverse in the socio economic field. Another communal aspect is that the housing could be arranged in clusters, in close proximity to one another. This reinforces the sense of community. As previously stated, business recovery is also very important to the overall recovery. The housing would not be housing alone but also provide live-work housing. A mixed-use program maintains a constant liveliness in the community. This could be seen as a return to the earlier development of U.S. cities before zone-based codes changed the landscape of communities.

The community must be involved in the project. By being directly involved in all aspects, the community would have a greater stake in the project. Members of the community would be part of the initial cleanup of the site, the planning of the project, and varying roles in the construction process. As previously seen in other projects, “sweat equity” could be a strategy in both the housing aspects of the project and also in the business incubator. The design solution should not be one of just rebuilding to an earlier standard, but to build more responsibly – in all aspects. “By rebuilding responsible homes in a devastated community families have a real base for contributing to the reestablishment of their community, rather than just getting by until the next disaster” (Biloxi 2014).

Section 5:
Site Context

Bay St. Louis is a small coastal town in southwest Mississippi. The city occupies a peninsula of land with a bay to the north, the mouth of the bay to the east, and the Mississippi sound (an area of open water separated from the Gulf of Mexico by barrier islands) to the south. As of 2013, the city covered 14.69 square miles of land (U.S. Census Bureau 2015). Located roughly 60 miles northeast of New Orleans, LA and 90 miles west of Mobile, AL, Bay St. Louis has a humid subtropical climate. Given its location on the Gulf of Mexico, Bay St. Louis is vulnerable to hurricanes and has been impacted by many over the years, but most notably, Hurricane Katrina made landfall here.

History

The city is named for the bay, the Bay of Saint Louis, which surrounds it. The bay was named in honor of the feast day of Saint Louis - the day which it was discovered - by Jean-Baptiste Le Moyne de Bienville, a French explorer. The area was claimed for France in 1699 and has had both French and Spanish influences, being ruled intermittently by each nation and also England (Hancock n.d.). From 1699 until 1763 the area was under French rule, but after England defeated France in the Seven Years' War, England maintained control (Hancock n.d.). In 1780, Spain took control of the area after declaring war with England, and Bay St. Louis became part of Spanish West Florida (Hancock n.d.). In 1783 England surrendered all of its ownership after the American Revolution but Spain still claimed the territory (Infoplease 2015). In September of 1810 the people living in West Florida proclaimed independence from Spain, who still claimed ruling power of the area, creating the "State of Florida" (MDAH n.d.). The area in which Bay St. Louis existed within the quick-lived state was then annexed by President James Madison in December 1810 (MDAH n.d.).

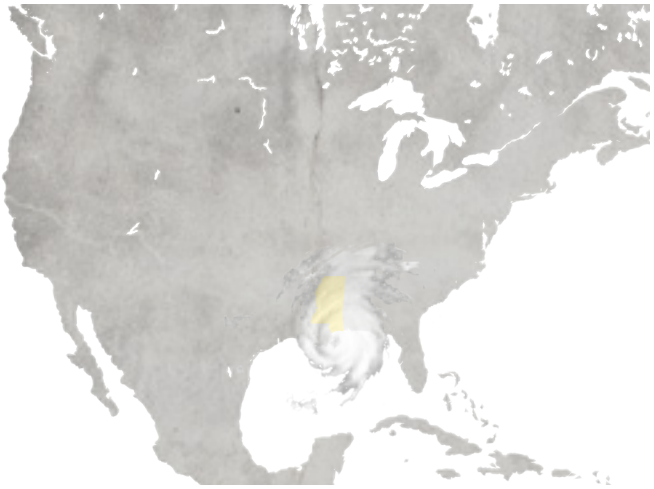


Figure 20. Mississippi in relationship to the U.S. with an image overlay of Hurricane Katrina (Author)

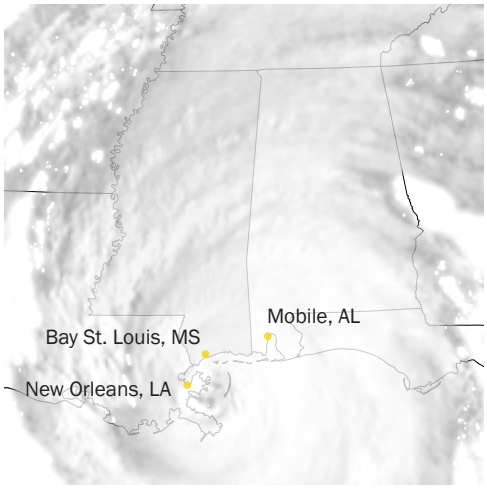


Figure 21. Bay St. Louis location with image overlay of Hurricane Katrina (Author)

The influences of Bay St. Louis' European history can still be seen in development patterns of the city. The street grid is one of the most evident relics of its history. The long narrow blocks which begin at the coast and move inland are a result of the *arpent* system of land development which attempted to give as many landowners water frontage (USGS 2015). This was a common system used by French settlers at the time, but then was continued through Spanish and American rule (USGS 2015). An arpent is a unit of length, being about 192 feet, and was used to divide land - usually 2 to 4 arpents wide by 40 to 60 arpents deep (USGS 2015). Development began at the coast and moved inward, with road networks extending from the coast inland as seen in Figures 22 and 23.

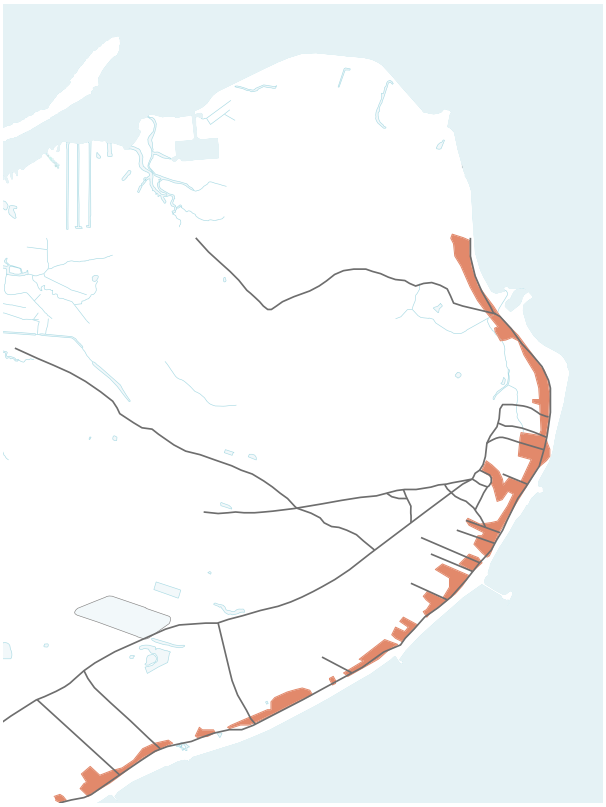


Figure 22. Coastal development and road network of Bay St. Louis in 1857 (Author, based on Coast 1857)



Figure 23. Road network of Bay St. Louis in 2005 (Author)

History of Natural Disasters

Hurricane Katrina was not the first major storm to impact this area. There have been many hurricanes in the history of Bay St. Louis, but three stand out in history for the damage they caused. The 1947 hurricane did extensive damage to the coast, killing 51 people in Florida, Mississippi, and Louisiana (Weather Bureau 1947). In 1969 Hurricane Camile made landfall between Bay St. Louis and Pass Christian, MS setting a record for the highest storm surge

at 24.6 feet (University 2015). In 2005 Hurricane Katrina made landfall near Bay St. Louis, bringing with it a 27.8 foot storm surge, breaking the record of Hurricane Camille and becoming the highest storm surge in recorded U.S. history (University 2015).



Figure 24. Hurricane of 1947 Damage (Hancock n.d.)



Figure 25. Hurricane of 1947 Damage (Hancock n.d.)



Figure 26. Hurricane Camille Damage in 1969 in Bay St. Louis (MDAH 2009)



Figure 27. Hurricane Camille Damage in 1969 in Pass Christian, MS (Extremeplanet 2012)



Figure 28. Hurricane Katrina Damage (Carr 2005)



Figure 29. Hurricane Katrina Damage (Fritz 2005)

Section 6:
Site Selection

Bay St. Louis has few major roads, but it is evident that housing development followed along these thoroughfares. Surveying different areas of the city based on the population of area, availability of open space, availability of services/existing infrastructure, and proximity to major roads allowed for a selection of nodes or neighborhood centers that could house community support centers. The areas are well connected to the greater city and open space that could be used for parks or temporary housing.



Figure 30. City nodes (Author)

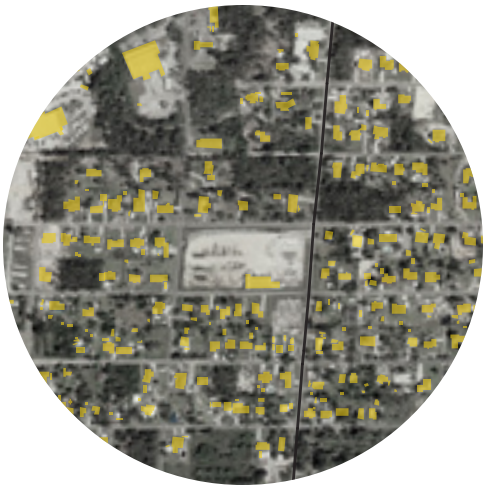


Figure 31. Turner Street Neighborhood. [A] (Author). The Turner Street neighborhood has one major road that runs north-south and connects the area to the highway to the north. The streets are gridded here but Turner Street serves as the major connector to the greater area. Population and availability of open space are the main factors in choosing this site.



Figure 32. Washington Street Neighborhood. [B] (Author). The Washington Street neighborhood is a historically African-American neighborhood and has a rich history. Its proximity to two major roads, its existing infrastructure, being a historically important area, and that it is diverse in socio-economics were the main factors in choosing this site.



Figure 33. St. Francis Street Neighborhood. [C] (Author). This neighborhood is just north of the Washington Street neighborhood and is also a historically African-American neighborhood with a rich history. Its existing infrastructure, proximity to two major roads, being a historically important area, proximity to recreation fields, and that it is diverse in socio-economics were the main factors in choosing this site.



Figure 34. Main Street Neighborhood. [D] (Author). Main Street, as its name implies is a major road, that runs east-west connecting the highway to the coast. St. Francis street, just south of Main Street connects this area to the St. Francis Street neighborhood. Its central location, commercial and residential infrastructure, proximity to two major roads were the main factors in choosing this site.

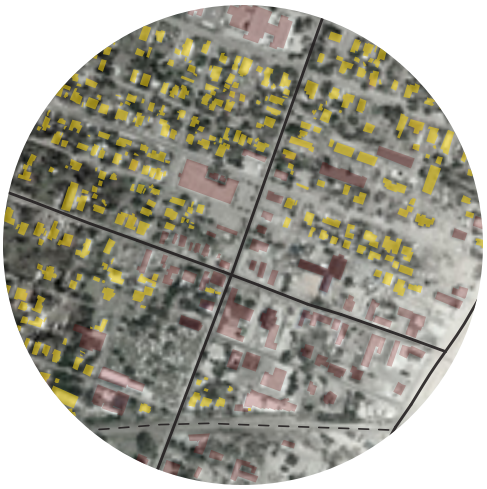


Figure 35. Central Business District. [E] (Author). This downtown area is the closest center to the coast. This is the most historic area in the city. Its proximity to two major roads, being a historically important area, and its mix of commercial and residential infrastructure are the main factors in selecting this site. A downside is that a community support center in this area serves less population.



Figure 36. Athletic Drive Neighborhood. [F] (Author). This area has the most sports fields in the area, allowing for a place for families and children to play.

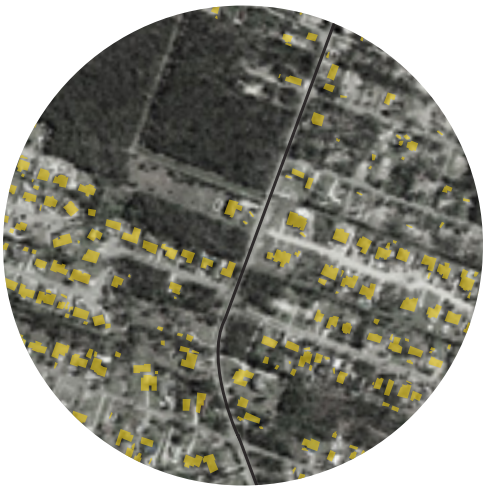


Figure 37. North Dunbar Ave. Neighborhood. [G] (Author). This area is developed around Dunbar Ave. that runs north-south, connecting this area to the highway, the Main Street neighborhood, the St. Francis Street neighborhood, and the Washington street neighborhood.

Neighborhood Selection

The St. Francis Street Neighborhood will be the site which to implement the proposed disaster recovery strategy. The neighborhood is about one mile inland from the coast and is well connected to other nodes in the city, including the downtown area or central business district. The site is also near the historic district and within a mile of churches and schools. This site was chosen for many reasons, but primarily because of its historical importance, its strong existing infrastructure, its availability of green space, and its diversity in demographics.



Figure 38. Site context (Author)

Neighborhood Context

The neighborhood has historically been an African-American community, but is diverse in many ways. One of the best attributes of the site is the existing infrastructure – having two important civic-oriented buildings within the neighborhood. The main civic site is an abandoned fire station. After the Hurricane Katrina flooded the site, the fire department left it vacant and moved to a building at a higher elevation. The site is composed of three buildings and has a deep history, originally being the Valena C. Jones Colored School, an African-American high school. The first main building was built in 1947 after the Hurricane of 1947 damaged the original school which dated back to the late 1800s (Showers n.d.). In 1953 a gymnasium and more classrooms were added, and in 1956 a vocational education shop was constructed (Unabridged n.d.). By 1969 desegregation came to Bay St. Louis and the school was used as an elementary school until 1972 (Showers n.d.). From 1972 until Hurricane Katrina flooded the building, the city of Bay St. Louis used the site for the police and fire departments and public works (Showers n.d.).

The second civic building in the neighborhood is a senior citizens center, just northeast of the Valena C. Jones school site. The center was originally located within the Valena C. Jones school site from 1972 until a standalone building was constructed for the center in the 1990s (City 2010). Having a senior citizens center within the neighborhood helps to diversify it and establish an intergenerational precedent.



Figure 39. St. Francis Street Neighborhood Context (Author)

The availability of green space and sports fields within the neighborhood were other aspects why this neighborhood was chosen for the proposed disaster recovery strategy. The importance of green space is well discussed in *Greening in the Red Zone* by Keith G. Tidball and Marianne E. Krasny (Eds.), a collection of cases and examples that propose access to green space confers resiliency in the recovery process after traumatic events. These spaces can provide a refuge for children and families.

The variation in housing and demographics is another reason this neighborhood was chosen. Both single-family and multi-family residences are present, as well as low-income rental housing and Habitat for Humanity housing. As the late American philosopher George Herbert Mead wrote, “Society is unity in diversity” (Mead 1981, 359). It is this diversity that makes this neighborhood unique within the city.

Diversity in housing typologies is another positive aspect of this neighborhood. There are two distinguished vernacular house typologies in the neighborhood: the Creole cottage, and the “shotgun” house. The Creole cottage is thought to have originated in the West Indies and brought to the southern U.S. in New Orleans by Haitian refugees (Vogt 1985). Likely brought to Bay St. Louis by way of New Orleans, the most common Creole cottage in the neighborhood is the three-bay cottage. In New Orleans, this cottage type was mostly built in the 1840s and 1850s (Vogt 1985). The shotgun house, having a similar history to the Creole cottage, was popular in New Orleans and again, likely brought to the southern U.S. by Haitian refugees (McAlester 1984). These houses were mostly built from 1880 to 1930 (McAlester 1984). It is also thought that both typologies have been influenced by the French and Spanish. The most notable feature of these houses is the porch. The porch is a very important aspect of the neighborhood and a place of social interaction. It is a way to connect with neighbors and passers-by fosters the sense of community.



Figure 40. Creole Cottage - Bay St. Louis (Hancock n.d.). The Creole cottage is typically square or rectangular in plan and divided into bays. The front is symmetrical on the longitudinal axis and gabled on the transverse. The house is generally raised on piers two to three steps off the ground with two entrances opening directly onto the porch.



Figure 41. Shotgun House - Bay St. Louis (Google 2013). The shotgun house is long and rectangular in plan and well suited for the typical narrow lots of Bay St. Louis. The house is generally raised on piers two to three steps off the ground and the roof is either gabled or hipped.

Section 7:
Proposed Recovery Strategy

This section focuses on the implementation of the proposed recovery strategy in the St. Francis Street neighborhood. This situational analysis is considering the site as it was in 2005 after Hurricane Katrina struck the city. The recovery strategy is proposed as a series of phases beginning after emergency response has been completed. The role of each phase is to foster the sense of community and to build upon the previous phase. Each intervention considers the importance of communal place, from the organization of temporary housing to the development of the community support center. Each phase is designed to meet the needs of the community in the various stages of recovery. The overall goal of the strategy is not only to return to a sense of normalcy, but to strengthen the community and create an overall improvement, or an elevated sense of normalcy. This strategy is not meant to be an overarching, didactic set of rules, but an exploration into a neighborhood with community strengthening being the driving design force. The approach of the strategy is not to wipe the slate clean, but to consider existing conditions and blend the old with the new.

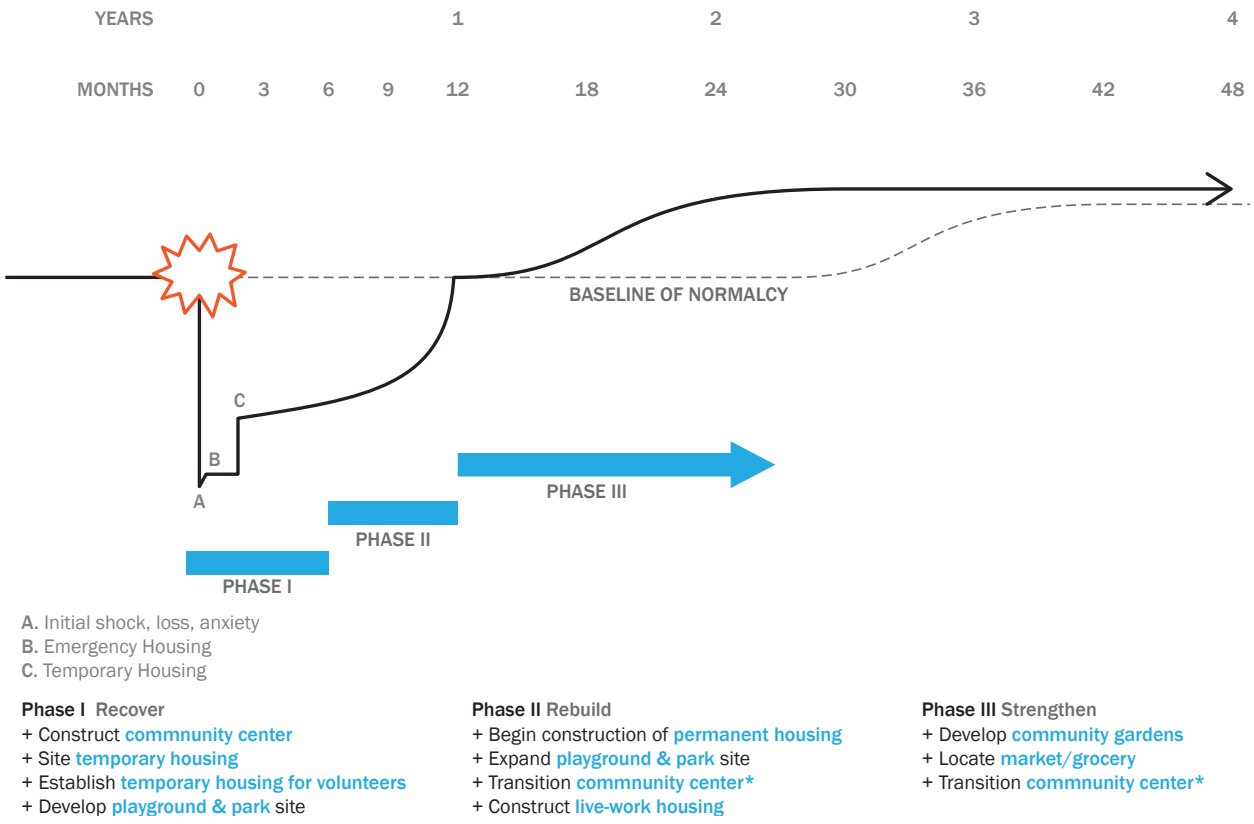
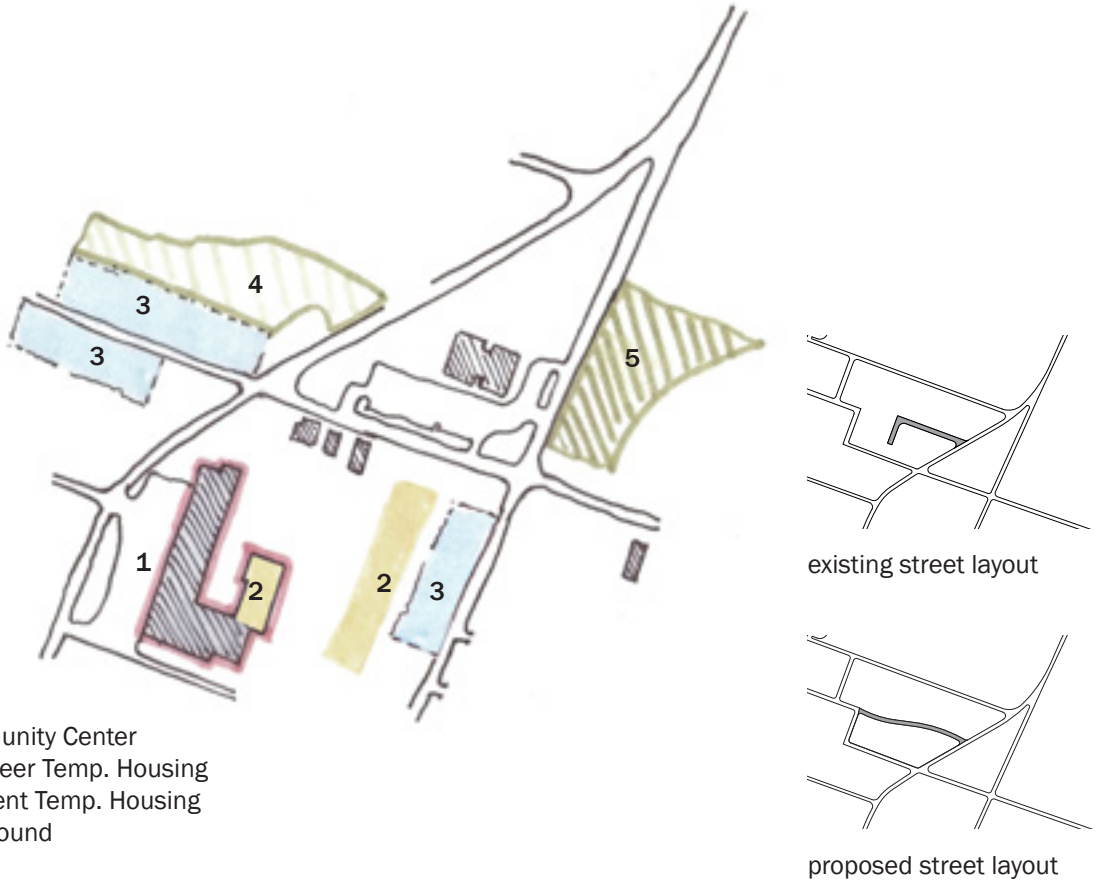


Figure 42. Baseline of normalcy diagram (Author) The diagram above is representation of the timeline of the proposed recovery strategy. It also represents the sense of normalcy as the phases of recovery progress, as compared to a baseline of perceived normalcy. A hypothetical return to normalcy is suggested by the end of Phase II, and an elevated sense of normalcy, meaning the "new normal" is better than the "old normal," occurs as Phase III progresses.

Phase I



1. Community Center
2. Volunteer Temp. Housing
3. Resident Temp. Housing
4. Playground
5. Park

Figure 43. Phase I Plan (Author)

The most important step in phase one is the conversion of the existing fire station, “1” in Figure 43, into a community resource center. This center is the anchor of the neighborhood and is the first step in bringing the community together. In this phase the community resource center would have three major functions as: a distribution center for goods and information, a cafeteria to provide meals to volunteers and residents - both within and from outside the neighborhood, and as temporary volunteer housing - as seen in Figure 48.

The distribution center provides a location for the delivery and distribution of donated items, as well as the distribution of information. After such a disaster there is chaos and confusion. By providing a location for residents to share and receive information, such as FEMA services, insurance information, and any other pertinent services that help the community, recovery can happen more smoothly. Classrooms from the original building are still intact, as seen in Figure 47, and after renovation, provide a location for members of the community to meet with support organizations, receive counseling, or just to informally gather for any reason.

Having a cafeteria in the project offers yet another way for the community to come together. A meal is an important aspect of the recovery process that is overlooked. The sharing of a

meal is an informal way for people to cross paths with others in the community. The services provided by the cafeteria are not solely focused on the neighborhood, but also the greater community. Being able to receive a meal provided by others lessens the burden on those who are rebuilding. Temporary housing might be cramped and difficult to prepare meals or it might be difficult to find the basic goods to cook with. After a disaster, many food items are provided by FEMA or NGOs, but these are usually meals ready-to-eat or MREs. While these items provide basic nutrition, a warm meal goes a long way and can provide a sense of comfort or normalcy.



Figure 44. Existing front elevation of fire station with operations center on left and gym on right (Burke 2008)



Figure 45. View of existing fire station with apparatus bays (Burke 2008)

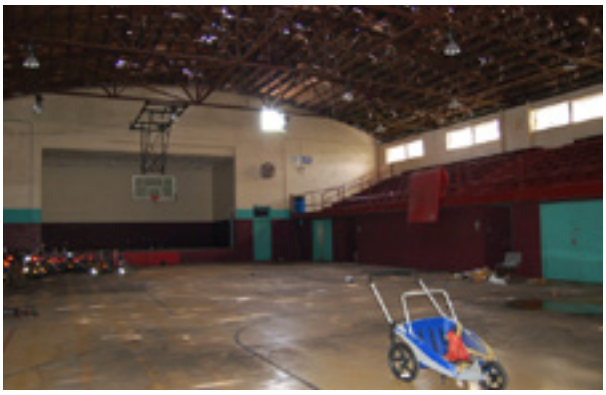


Figure 46. Interior view of existing gymnasium (Burke 2008)



Figure 47. Interior view of original classroom (Burke 2008)

Volunteers are an integral part of the recovery process. While many volunteer organizations and NGOs provide temporary housing for themselves, it is usually not much more than large tents. By providing a location for volunteers to live temporarily, the community support center offers a place of interaction for volunteers and members of the community, as well as a more structured shelter. Part of the volunteer housing is situated in the original vocational education shop which is open in plan and basically just a masonry shell with a roof. The building provides temporary housing for 20 volunteers. Just as the other buildings of the complex would need to be renovated, so too would this building. Large rolling doors allow for prefabricated modules to be brought in. These modules are prefabricated rooms that act as sleeping quarters. Similar to the sleeping quarters, restrooms and showers are composed of prefabricated modules. As the needs of the community change and volunteers leave, the modules can be broken down and carted out just as they were brought in.

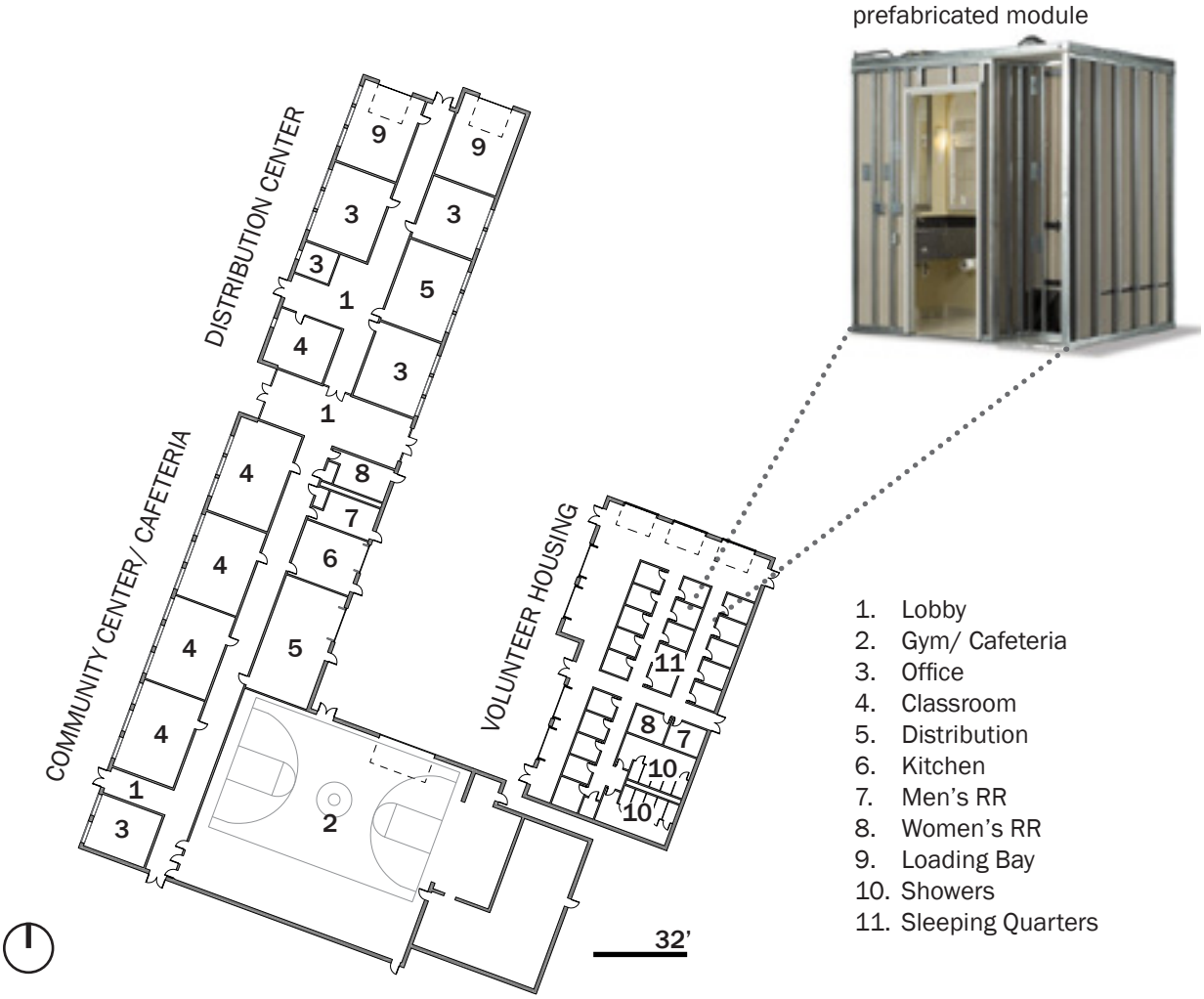


Figure 48. Phase I Community Support Center Plan (Author). Prefabricated module by Eggrock Modular Solutions (Business 2008)

The layout and organization of temporary housing is an important consideration in Phase I. As previously discussed, there are positive and negative aspects of the current models of temporary housing deployment. A personal-focused model, while allowing the resident to live directly adjacent to their home, could deter from community engagement by causing too much inward focus. The group site model solves logistical problems yet is institutional in reality. Two models are proposed that strive to meet logistical needs of housing many people in a given area, while still being focused on a central communal place, as seen in Figure 49, diagrams c and d. This central communal place can be anything from a building, as see in Figure 49, diagram c, to a communal green space. The organization of diagram c is based on the group site model, and diagram d is a hybrid of the private site model and the group site model. In diagram d, the temporary housing is not directly on the residents' property, but still close enough to maintain security and easy access. These abstract diagrams are not meant to be the only solutions, but examples of challenging the existing strategies and focusing on communal places. As seen in Figure 43, the location of temporary housing for residents is adjacent to the streets like permanent housing was previously. This allows for the temporary housing units to be easily connected to existing utilities or when new utilities are required, they would be also used in Phase II for permanent housing.

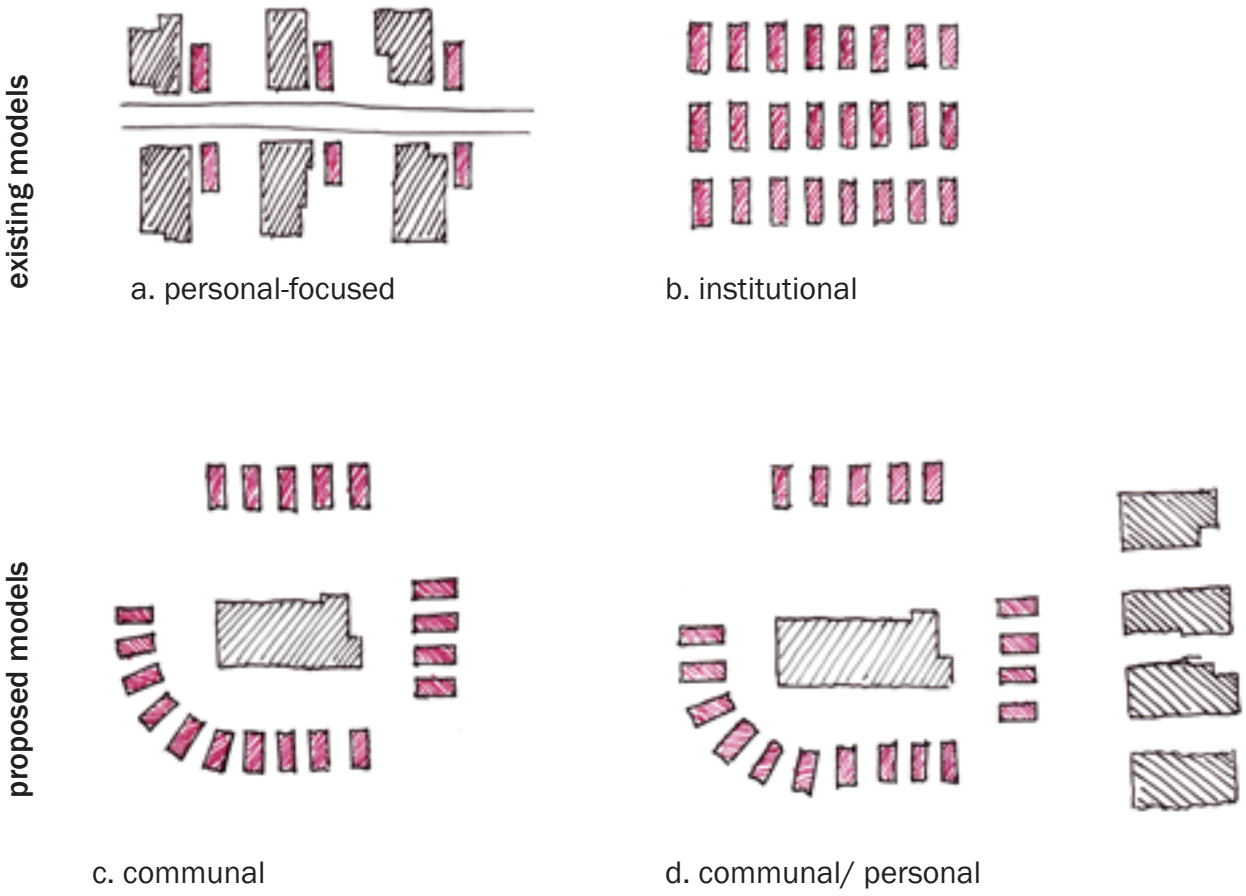
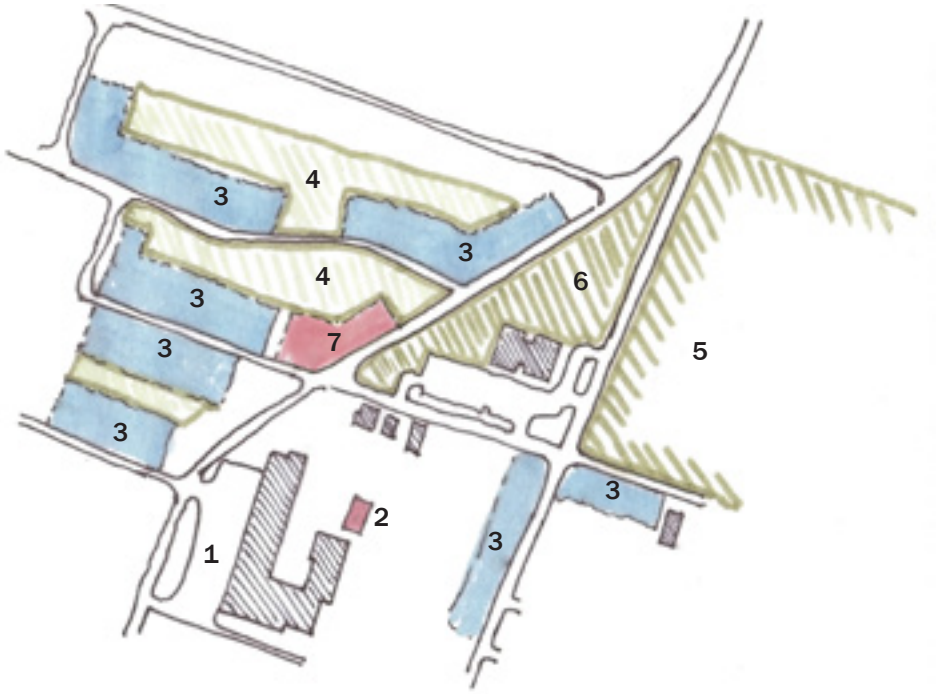


Figure 49. Current and proposed models of temporary housing organization (Author)

A playground and park are designed to be implemented in Phase I also. These green spaces, as previously stated, provide a place of play or recreation for children and families. Children need places to play, and as critiqued in previous precedents, not having enough recreation places for children is a detriment to the project.

Phase II



1. Community Center
2. Cafe
3. Permanent Housing
4. Playground
5. Park
6. Senior Citizen Park
7. Live-Work Housing

Figure 50. Phase II Plan (Author)

The plan of Phase II builds upon that of Phase I, considering the continual improvement in life quality. Besides the move into permanent housing, the major additions in Phase II are the expansion of the playground and park sites, a cafe, and live-work housing. The addition of the senior citizens park gives the existing center more program and place that invites intergenerational engagement. The introduction of the cafe and live-work housing is to help bolster the economic recovery of the community. These two programs invite others outside of the neighborhood, either into new construction housing or as patrons of new businesses.

One of the most important aspects of Phase II, however, is the organization of permanent housing. The organization of the permanent housing is focused on central green spaces and grouped in clusters. The key factors of these housing clusters is access, green space, connection to the greater neighborhood, density of housing, communal space, and a mix of single and multi-family housing. This layout is common to that of “pocket neighborhoods” as seen in Figure 51 and 52. This is in contrast to the original model of housing on the site. Instead of maintaining an entire lot, the property owner has a small front and side yard and shares the common green space with neighbors. These green spaces can either be gardens, yards, or playgrounds. By situating the housing around these communal green spaces, the community can maintain attention on children playing here, but it is also a strategy to foster the sense of community. The new density in housing is a move away from the typical single family home on a lot into a more communal group of houses. This creates situations of crossing paths or an increase in neighborly encounters.



Figure 51. Example pocket neighborhood plan (Ross Chapin Architects n.d.). Houses on the left are grouped around a common courtyard.



Figure 52. Example pocket neighborhood plan (Ross Chapin Architects n.d.). Houses on the left are grouped around a common green space.

Not only is the organization of the permanent housing important in Phase II, but also its architecture. The housing will draw from the vernacular, with much importance given to the porch. As seen in the creole cottage and shotgun houses of the neighborhood, the front porch will be key in the new housing development. The porch is the intermediate zone between the public realm and the private. It is a common place to speak with neighbors and informally meet within the neighborhood. Where housing fronts the street and backs to a common area, it is assumed that the housing would have both front and rear porches.

The street is another aspect of the community environment changed in Phase II. Existing streets in the neighborhood lack sidewalk and defined planting areas, but the addition of these two within the existing right-of-way would enhance the neighborhood. New housing would be raised and the front setback only six feet from the sidewalk, as seen in Figure 53. The addition of sidewalks increases the connectivity of the neighborhood and the trees and planting areas adjacent to the sidewalk both shade the pedestrian and separates the pedestrian from the street. Parking is off-street and adjacent to the house.

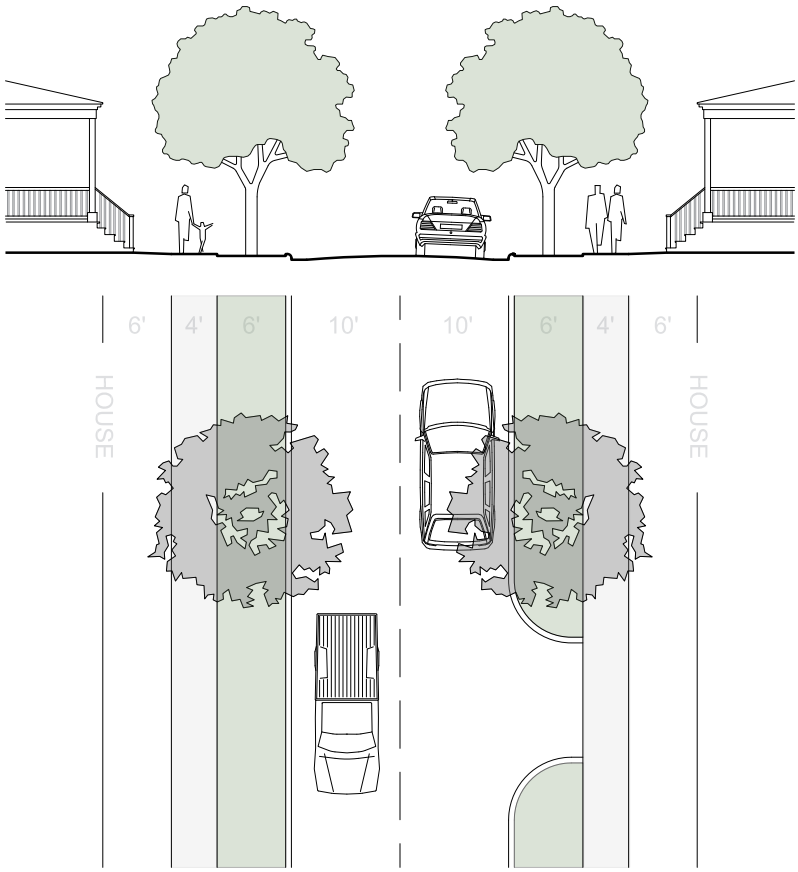


Figure 53. Proposed street section and plan (Author)



Figure 54. Existing figure-ground diagram showing the demolition of extremely damaged buildings in light gray (Author)



Figure 55. Proposed figure-ground diagram (Author)

Phase III



1. Community Center
2. Senior Activity Center
3. Single-Family Residential
4. Multi-Family Residential
5. Playground
6. Park
7. Corner Market
8. Community Garden
9. Live-Work
10. Cafe
11. Basketball Court

Figure 56. Aerial perspective of Phase III (Author)

Phase III is the final phase of the proposed recovery strategy. The addition of community gardens and a corner market, and a transition of the community support center begins Phase III. It is in this phase that the community has not only fully recovered but continues to strengthen and become more resilient. The majority of commercial development is anchored at the intersection of Bookter Street (running from the bottom center to the upper left of Figure 54) and Old Spanish Trail (the diagonal street fronting the community center). This intersection is also the location of the community support center and is the physical center of the neighborhood. Live-work housing blends the commercial and residential at this intersection and provides a threshold into the neighborhood.



Figure 57. Aerial perspective diagram of housing clusters and shared green space (Author)



Figure 58. Existing green space diagram (Author)



Figure 59. Proposed green space diagram (Author)

The amount of public and semipublic green space is greatly increased as compared to the site before. Sharing green spaces as opposed to having individual yards is different than the traditional development that existed on site before. It could be seen as a sacrifice, but gaining a better sense of community is the overall goal. Children no longer have just their own yards to play in, but the entire neighborhood's.

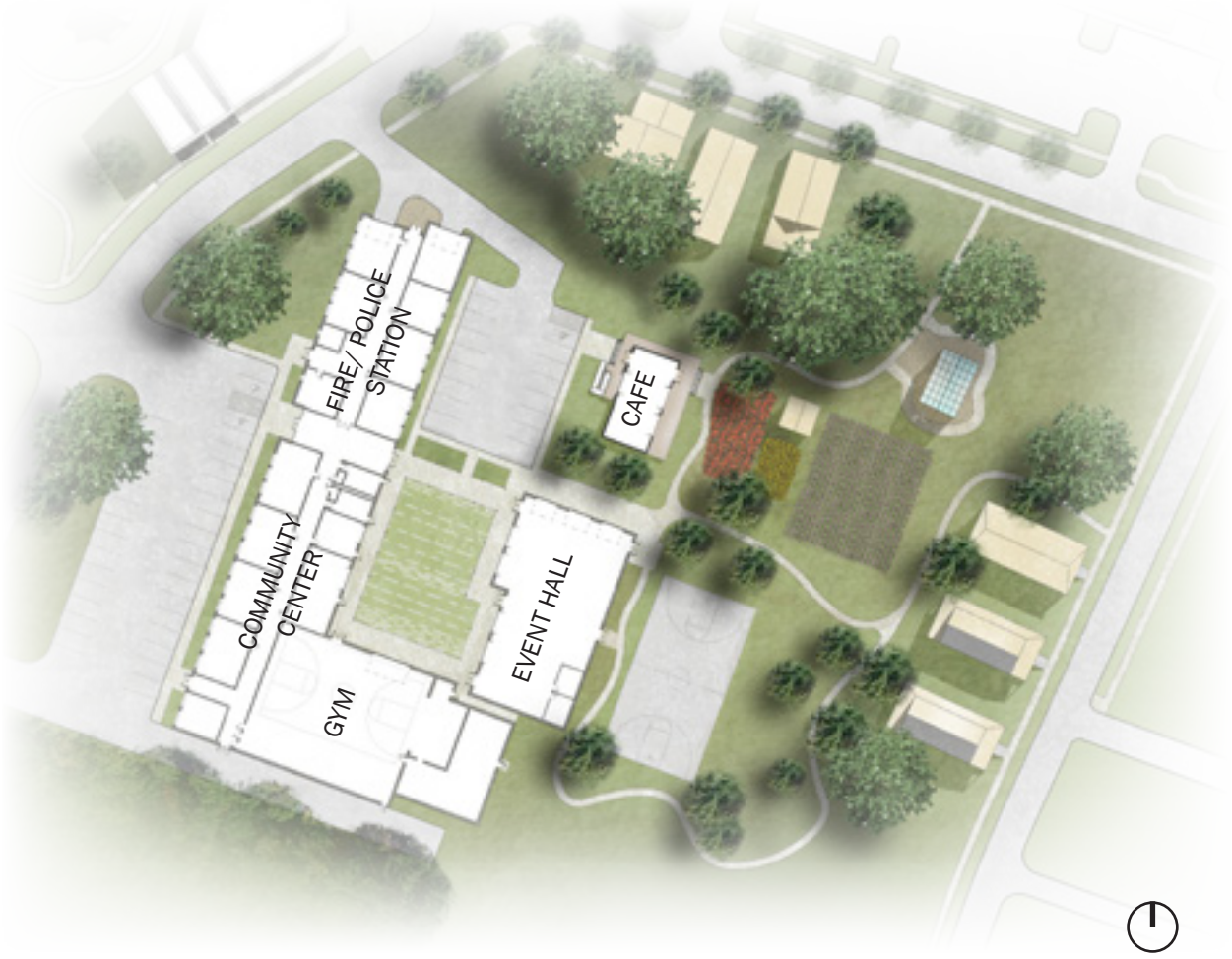


Figure 60. Community support center site plan (Author)

The community support center site is the anchor of the neighborhood. In Phase III, the community gardens were added, along with a greenhouse and utility shed. The gardens are meant to be used by the neighborhood, but the entire site is meant to be open to the rest of the public community. Sidewalks and trails are important to the site and the neighborhood in general, connecting the new improvements to the rest of the neighborhood. Large live oak trees that weathered the hurricane remain on site and along with smaller new trees, provide shading and help delineate areas of the site.

A plaza has been added between the community center and the new event hall. It is a combination of grass and linear concrete pavers that vary in density depending on function and location. The pavers mimic the linear nature of the buildings and follow the transverse axis from the front of the community center through the main lobby to the event hall. Each room adjacent to the plaza opens on to it, supporting the flexibility of it, including restrooms, the kitchen, and a multipurpose room. The event hall has multiple openings onto the plaza and the gym has a large overhead door that can open the gym to the plaza for events such as community theater or a farmers market.

By Phase III, the community support center program transitions to coincide with the needs of the community. After the community has recovered enough to no longer to require the support of government aid organizations and NGOs, the infrastructure built or renovated in the first phase of the community support center can be used for other means. The kitchen equipment needed for the cafeteria can be used by the community for events or for demonstrations.

In this phase, the distribution center transitions into a satellite police and fire station. The neighborhood was well served by it before and the existing infrastructure makes for an easy conversion. The station is connected to the community center by a large lobby but can be secured as a standalone structure. Also, the site volunteer housing from Phase II is converted to a large, open event hall. This hall could be rented out for weddings or for other occasions.



Figure 61. Phase II-III community support center plan (Author)

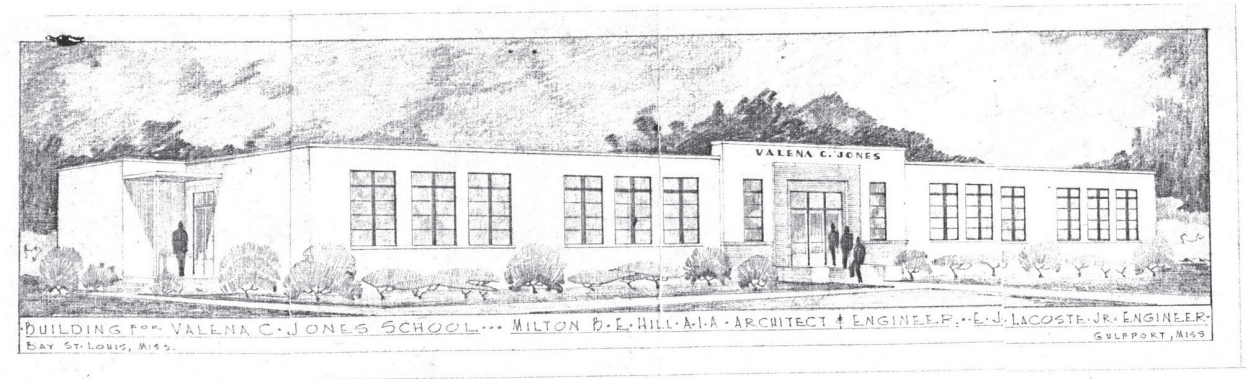


Figure 62. Original perspective drawing of Valena C. Jones school (Unabridged Architecture n.d.)



Figure 63. West elevation of community support center after proposed renovations (Author). The windows have been restored to the original style and clerestory windows added to bring light into the long central corridor. The main entry is inset into the building and a storefront system has been added for additional transparency.



Figure 64. Cafe and event hall west elevation (Author). The cafe is a new construction on the site and as such, its material differs from original buildings on site. It is wood clad and raised similar to the houses in the neighborhood. The cafe has large glass doors that open onto a deck and are protected by a folding, hangar-style door that acts as a canopy when in the "up" position. The event hall has similar large glass doors with protective, hangar-style doors that can be lowered to protect from storms or just provide another level of protection.



Figure 65. North elevation of complex (Author). Both the event hall and the cafe have butterfly roofs that can collect rainwater. The roof of the original vocational education building, which is now the event hall, is completely new with large, storm-resistant polycarbonate clerestory windows. A large, transparent hangar-style door on the gymnasium wall opens to the plaza and creates a canopy for area below, which can be used for a stage.

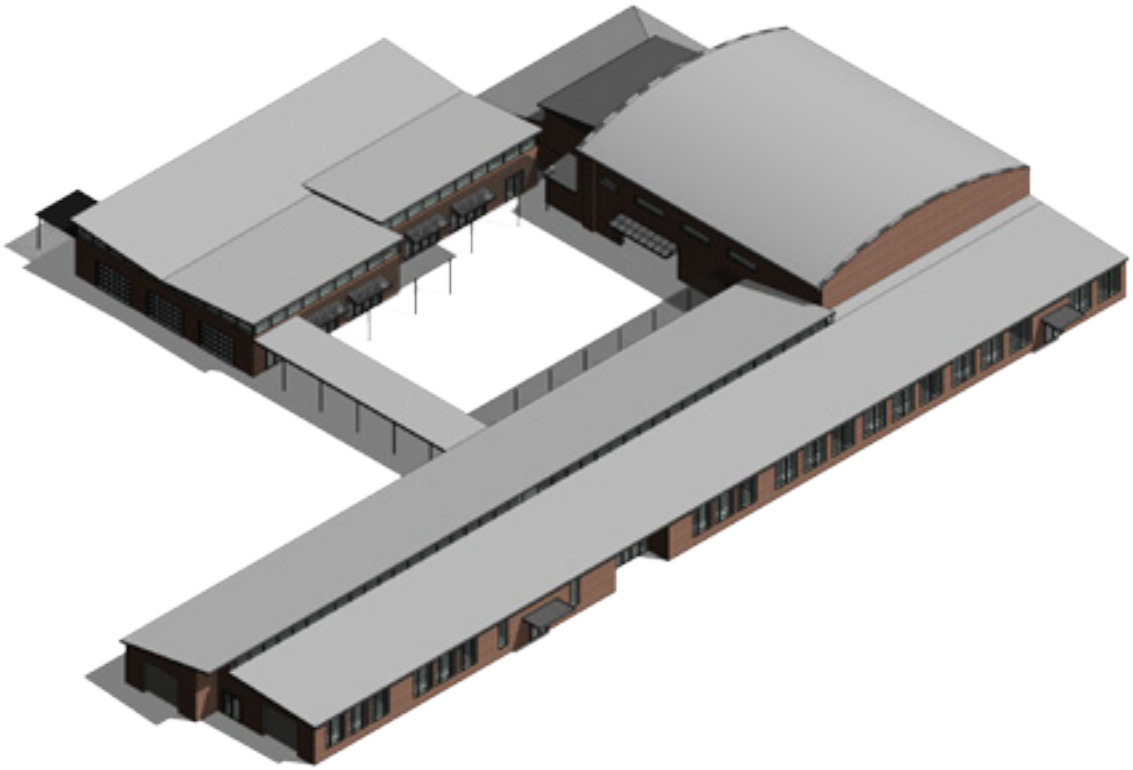


Figure 66. Isometric view of community support center (Author)



Figure 67. Perspective of plaza with cafe in the distance and event hall to the left (Author)



Figure 68. Perspective looking from parking lot with cafe on the left and event hall and gym in the distance (Author)

Section 8:
Transferability

These guidelines are general best practice strategies that could be employed in community rebuilding by meeting the needs of basic shelter, service and amenities, and life quality needs.

Initial Stages of Recovery

- Determine the availability of resources.
- Understand the skills and culture of the community.
- Focus on simultaneous rebuilding of both housing and community places.
- Organize temporary housing (both for volunteers and residents) in a manner that fosters interaction and the sense of community.
- Locate neighborhood centers or centers of the community that have existing infrastructure which can be utilized for community support centers.
- Survey and prioritize the needs of the community, especially vulnerable populations including the elderly, disabled, and children.
- Determine which needs could be met with a community support center.
- Develop a strategy for transitioning of community support centers that coincide with the needs of the community in the various stages of recovery.
    - Possible programs for community support center:
        - Shelter
        - Distribution center for goods and information
        - General community meeting place
        - Satellite police and fire station
        - Multipurpose event center
- Establish playgrounds and recreational places for the neighborhood and community.

Secondary Stages of Recovery

- Understand the vernacular of the region or community.
- Explore alternative development strategies for neighborhood layout and permanent housing.
    - Housing cluster or “Pocket Neighborhood” Strategy:
        - Housing in close proximity and gathered around shared open spaces.
        - common yards
        - green space
        - connected to greater neighborhood
        - density of housing
- Develop for a variation in housing to meet family needs.
    - mix of sing-family and multi-family housing
    - draw from the regional or community vernacular
- Plan for a multiplicity in demographics
    - intergenerational

    - various socio-economic statuses
- Introduce program to the neighborhood that fosters economic recovery and meets life quality needs.
    - live-work housing
    - corner market/grocery
    - cafe/restaurant
    - green space/ parks/ gardens
    - visible playgrounds and recreation areas

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Vita

Ryan Stechmann was born and raised in Bay St. Louis, Mississippi and attended high school at Saint Stanislaus High School. Hurricane Katrina was a major event in his life after making landfall in his hometown during his senior year. After graduating from Saint Stanislaus, Ryan attended The University of Southern Mississippi. In May of 2010, he received a Bachelor of Science in Architectural Engineering Technology with highest honors. Following graduation Ryan began to work for Clearpoint Consulting Engineers, P.A. in Hattiesburg, Mississippi. He knew he wanted to pursue a master's degree in architecture, so after two years working in the engineering field, he began attending The University of Tennessee to earn a Master of Architecture degree. His understanding of architecture and the built environment was influenced by his undergraduate education, his work experience in the engineering field, and most of all by the knowledgeable and talented faculty in the College of Architecture and Design at The University of Tennessee. In his three years of study, he was instructed by internationally recognized architects and was able to travel the United States, studying architecture.