

PUBLIC HOUSING AFTER HURRICANE, URBAN RENEWAL OR REMOVAL?
THE CASE STUDIES OF BEAUMONT AND GALVESTON, TEXAS

A Thesis

by

THO NGO DUC TRAN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF URBAN PLANNING

Approved by:

Chair of Committee,	Shannon Van Zandt
Committee Members,	Walter G. Peacock
	Wesley Highfield
Head of Department,	Forster Ndubisi

May 2013

Major Subject: Urban and Regional Planning

Copyright 2013 Tho Ngo Duc Tran

ABSTRACT

Decent housing is a goal for many people not only in the United States but elsewhere in the world. A house becomes the symbol of family spirit whether it is a single-family or multiple-family home. Public housing in the United States is housing of “last resort,” for families whose incomes do not allow them to find housing in the private market. Yet, many studies focusing on public housing find a host of social issues plaguing these units. The US Government has initiated various programs to improve the quality of public housing as well as the living condition of local resident through agenda of Department of Housing and Urban Development (HUD). HOPE VI is one of the major programs that focuses on distressed public housing. This program funds local government and housing authority in order to revitalized or rebuild public housing. This program has been very successful in providing high-quality housing for public housing residents.

However, as any type of construction, housing usually received great damage when natural disaster happening. It can be partly damaged or completely destroyed due to the direct and indirect effects of disaster. Public housing, like most affordable housing, is often built in highly vulnerable areas, such as floodplains or other low-lying areas. When disasters such as hurricanes strike, housing located in these areas is likely to receive the greatest damage and recovery may be slower.

This study looks at the case study of public housing in Galveston and Beaumont after Hurricane Ike (2008) and Rita (2005). After Hurricane Rita in 2005, Beaumont has rebuilt some public housing development with a HOPE VI grant awarded in 2007. These areas have successfully rebuilt through the cooperation of housing authority, local government, local residents, and developers. In contrast, Galveston could not reach agreement about the destiny of public housing after Hurricane Ike in 2008. This story becomes more serious when HUD announced that if Galveston cannot rebuild public housing in disaster area, they must refund the money to the federal Government. These two cities provide a comparative case study of the rebuilding of public housing after disaster, where one successfully rebuilt while other did not.

By looking at the secondary data sources, this research analyzes the situation of these places in different period: before the Hurricane, when the Hurricane happened, and after the Hurricane. The paper will address the similarities as well as differences between two case studies in term of historical profile, demography, public housing program characteristics, damage, and recovery. Besides, economic change after hurricane approached is addressed. The housing situation will be further analyzed in Galveston to clearly show the obstacles in which this city coped with. Finally, the study will conclude by suggesting some implications for theory, housing policy, management, and further research.

ACKNOWLEDGEMENTS

The author wishes to acknowledge the guidance and assistance of Dr. Shannon Van Zandt and Dr. Walter G. Peacock in the study design, analysis method, and data collection. He would like to acknowledge the support and recommendation from Dr. Wesley Highfield. Finally, the author acknowledges Mr. Travis W. Liska and Ms. Sara Hamideh with the support in finding and working with census data set.

TABLE OF CONTENTS

	Page
ABSTRACT	ii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	ix
1 INTRODUCTION	1
1.1 Housing in the U.S.....	1
1.2 Natural Disaster in the U.S.....	7
1.3 Field of Research	10
1.4 Two Case Studies for Research	13
1.5 Research Questions.....	17
2 LITERATURE REVIEW	18
2.1 Public Housing	18
2.2 HOPE VI Program and Impact on Public Housing Development.....	22
2.3 Recovery after Disaster	25
2.4 Housing Recovery Processes after Natural Disaster	29
3 TWO CASE STUDIES	32
3.1 General Information of Beaumont, Texas	32
3.2 General Information of Galveston, Texas.	33
3.3 The Hurricanes	33
4 PUBLIC HOUSING IN CASE STUDIES	41
4.1 Public Housing in Beaumont, Texas	41
4.2 Public Housing in Galveston, Texas.....	47
5 CASE STUDIES COMPARISONS	54
5.1 Methodology.....	54
5.2 General Trends Analysis	54

5.3	Public Housing Areas Analysis	59
5.4	Economic Analysis in Two Cities before and after Hurricanes	65
5.5	Galveston Housing Analysis	69
6	SUMMARY AND DISCUSSION.....	75
6.1	Similarities.....	75
6.2	Differences.....	76
6.3	Discussion.....	78
6.4	Policy Implication.....	80
6.5	Practical Recommendations	81
6.6	Research Limitations	82
6.7	Additional Research Needed	82
	REFERENCES	83
	APPENDIX A	92

LIST OF TABLES

	Page
Table 1. Public Housing Developments in The City of Beaumont, Texas	42
Table 2. Public Housing After Hurricane Ike in The City of Galveston, Texas	48
Table 3. Group of Ages in Beaumont, Texas	55
Table 4. Group of Ages in Galveston, Texas	55
Table 5. Race in Beaumont, TX	57
Table 6. Race in Galveston, TX	57
Table 7. Housing Characteristic in Beaumont, TX	58
Table 8. Housing Characteristic in Galveston, TX	58
Table 9. Group of Ages in Public Housing Areas in Beaumont, TX	60
Table 10. Group of Ages in Public Housing Areas in Galveston, TX	60
Table 11. Race in Public Housing Areas in Beaumont, TX	62
Table 12. Race in Public Housing Areas in Galveston, TX	62
Table 13. Housing Characteristics in Public Housing Areas in Beaumont, TX	64
Table 14. Housing Characteristics in Public Housing Areas in Galveston, TX	64
Table 15. Jobs in Beaumont, TX Before and After Hurricane Rita (2005)	65
Table 16. Jobs in Galveston, TX Before and After Hurricane Ike (2008)	66
Table 17. Work Movement Before and After Hurricane Rita (2005)	67
Table 18. Work Movement Before and After Hurricane Ike (2008)	67
Table 19. Jobs by Distance Before and After Hurricane Rita (2005)	68
Table 20. Jobs by Distance Before and After Hurricane Ike (2008)	69

Table 21. Housing Unit in Structure in Galveston, TX.....	70
Table 22. Housing Occupancy in Galveston, TX.....	71
Table 23. Value of Owner-Occupied Housing Unit in Galveston, TX.....	72
Table 24. Gross Rent As a Percentage of Household Income in Galveston, TX.....	73
Table 25. Gross Rent Monthly of Rental Housing Unit in Galveston, TX.....	74

LIST OF FIGURES

	Page
Figure 1. Annual Housing Starts by Building Type, 1975-2006	3
Figure 2. Homeownership Rate, U.S., 1900 to 2008	4
Figure 3. Median Housing Cost Hardens for Renter and Home Owners, 1975-2008	6
Figure 4. United States Natural Disaster Risks Map.....	8
Figure 5. Fit Requirements for Disaster Recovery Planning	28
Figure 6. Age Proportion of Population in Beaumont and Galveston, TX	56
Figure 7. Race in Beaumont and Galveston, TX.....	57
Figure 8. Housing Characteristic in Beaumont and Galveston, TX	59
Figure 9. Group of Ages in Public Housing Areas	61
Figure 10. Race in Public Housing Areas	63
Figure 11. Housing Characteristics in Public Housing Areas	64

1 INTRODUCTION

1.1 Housing in the U.S.

1.1.1 Brief History of Housing Act Legislation

As any other place in the world, housing plays fundamental role in social life of individual as well as public concern. Housing is one of the top priorities in US Government's annual agenda. In addition to other aspects of social development, housing and market have a mutual relationship which affects different issues such as: housing type, home ownership rate, or affordability.

Until World War II, the majority of housing in the United States is rental. The condition of rental housing was a major concern of society (Colton, 1994). The Housing Act of 1937 (also called the Wagner-Steagall Act) provided for subsidies for low-income family by the U.S. government. This funding was spent through the local public housing agencies in order to improve the living conditions of residents.

The Housing Act of 1949 played important role in setting up goals to achieve decent housing for people in the post war period. This national legislation also contributed to the slum clearance and urban renewal programs. According to the Title III of Housing Act 1949, the federal money was extended to build more than 800,000 public housing units. One of the main elements of this Housing Act include funding for research about housing and technique as well as allowing the Federal Housing Administration provide financing for rural homeowners.

The Housing and Urban Development Act of 1965 created the Department of Housing and Urban Development (HUD). For the first time, a rent subsidy mechanism was introduced, making a major improvement in the housing market in the US. This new inventory encouraged the private sector widely participate in constructing low income housing. The Federal Housing Authority would insure mortgages for non-profit developers who directly build homes for low income families. Further, vouchers were

introduced. The voucher program helped the federal government satisfying the large demand for housing from households by helping them pay partly for the market rent. The Housing Act 1968 showed the efforts of the federal government in order to find appropriate forms for housing development, such as Garden Cities model of Ebenezer Howard. The Act focused on preventing the development of high rise building after recognizing its negative effects on families with children. Besides, this model is proved with the connection to poverty's concentration as well as unsuitable for families (Baumanand and Biles, 2000). The demolition of the Pruitt-Igor development in St. Louis, Missouri was one of the most dramatical events which were happen with public housing this time. The thirty three high rise buildings development was constructed in 1955 and 1956 with 2,870 units. At the end of 1960s, the vacant rate reached about 65%, among other social and physical problems. These things led to the demolition of the project in 1972.

The Housing and Community Development Act of 1974 created the Section 8 Housing Program in order to engage more involvement of private sector in constructing affordable housing. This financial support worked by assisting poor tenants through giving a monthly subsidy to their landlords. This program was able to be project-based or tenant-based mechanism. The latter is now the primary mechanism of financial support for low income families. In addition, the Community Development Block Grant (CDBG) was created in this time. Generally, this funding was transferred to state and local government for housing and community development projects.

Under the Reagan administration, household contribution through Section 8 program was increased to 30% of household income and fair market rents were lowered. In addition, emergency shelters for the homeless were expanded and home ownership by low-income families was increased to a greater degree (Hays, 1995), President George H. W. Bush signed the Cranston-Gonzales National Affordable Housing Act (NAHA). This supported the use of HOME funds for the rental financial supports. The HOPE VI program was launched in 1992 with the main concern of demolishing poor-quality public housing project and move residents into mixed-income areas. Although the

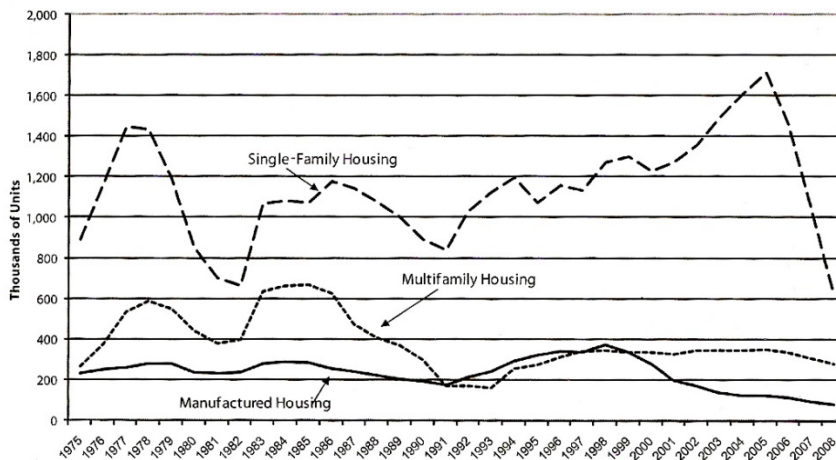
program suffered funding cuts in 2004, it is now one of the major tools used by the federal government for dealing with the construction of new federally subsidized units.

1.1.2 Housing Construction Trends

From 1975 to 2008, an average of 1.7 million new residential housing units was produced annually. The changing of the larger economy is one of the fundamental factors that directly affected the trends in housing construction. From the mid-1980 until 2008, residential construction was dominated by this particular type of housing, single-family homes. With the failure of secondary mortgage market in housing finance, the housing market started plummeting in 2007 and 2008. Single-family homes experienced the greatest drop.

According to Figure 1_ Annual housing starts by building type, 1975-2006, the single-family house accounted for the largest part of housing development. It gradually increased from 1991 with minor reduces in 1994-1995 and 1997-1998. Single family homes reaches highest proportion in 2005 with about 1.7 million units built annually. Multi-family housing maintained steady development from 1993 and started decrease in 2006 after reaching about 380,000 housing unit annually.

Figure 1. Annual Housing Starts by Building Type, 1975-2006



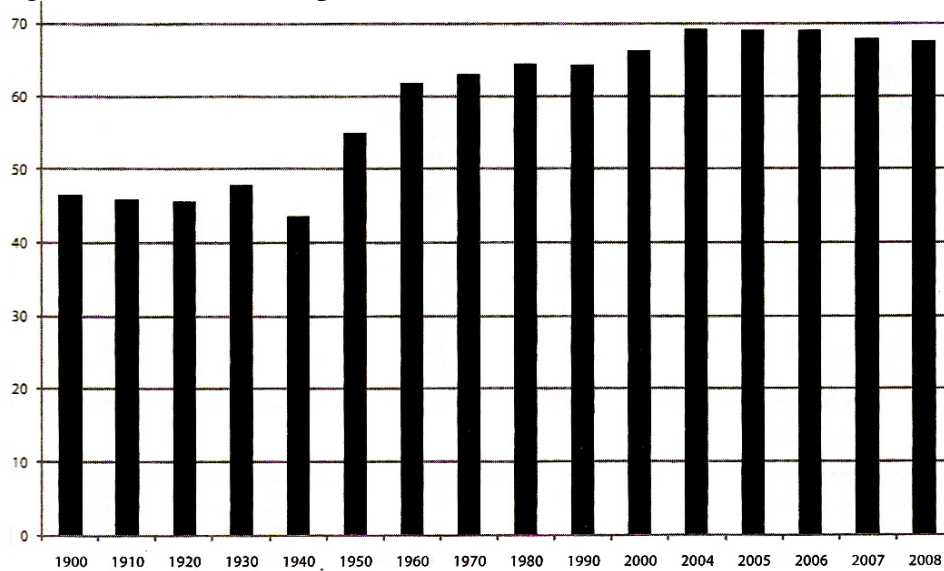
Source: Schwartz, A. 2010. *Housing Policy in the United States*.

1.1.3 Tenure Trends

The tenure trend witnessed a dramatic change from renting to owning. This change took place in only two decades from the later part of World War II (1940) to 1960.

According to Figure 2, the homeownership rate jumped from 44 percent in 1940 to 62% in 1960. This is the first time in history that the majority of the U.S. population switched to home owners. From that, this number increased in two following decades then declined slightly in 1980 to 64%. Until 2004, the homeownership rate had increased when it achieved a peak of about 70% ownership. The surge in foreclosure after the housing bubble burst in 2007 also contributed to this decline in homeownership rate.

Figure 2. Homeownership Rate, U.S., 1900 to 2008



Source: Schwartz, A. 2010. *Housing Policy in the United States*.

1.1.4 Housing Affordability

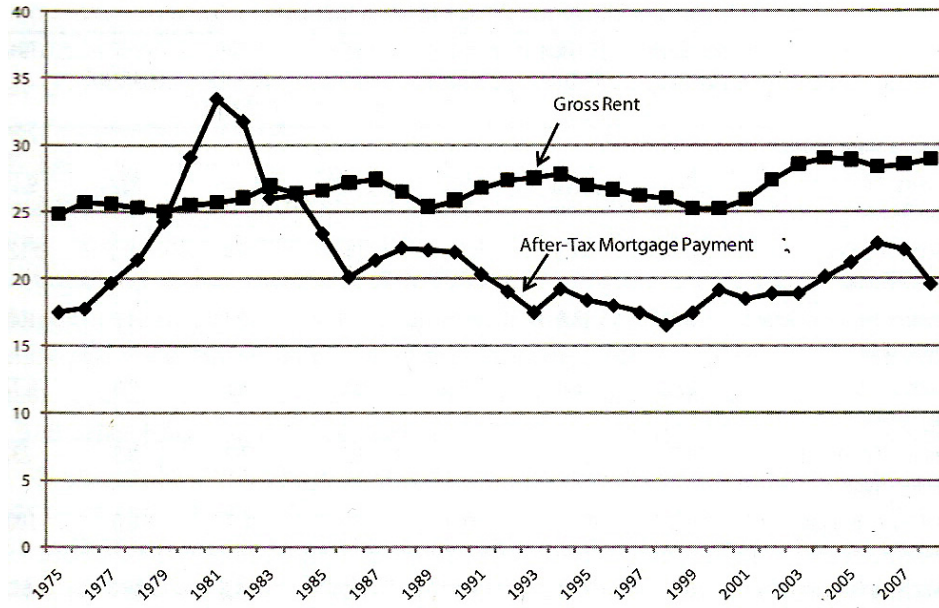
Owning a decent house is a goal of everybody. People started contributing time and health to work for their family's future. However, one of the biggest issues preventing

people owning a house is affordability. This characteristic of housing is unique and totally different from other physical conditions. The affordability is an intangible aspect that closely related to housing price and household income. These issues depend on the larger economy as well as housing policy in different periods of time.

In the United States, the common standard of housing affordability is 30% of family's income. Any household who spend more than 30% of their pre-tax income for housing is considered as having a housing cost burden. And, the situation becomes severe if family has to spend more than 50% of their income on housing. The affordability of housing is varied between owner-occupied housing and rental housing. With the rental housing, the affordability can be seen as the ratio between the rent (which includes utilities cost) to income. For homeowner, one must also factor in the tax benefit from mortgage interest and real estate taxes and the potential for capital appreciation (Schwartz, 2010).

There are several ways to measure housing affordability. The most widely used method is looking at the percentage of income spent on housing. For instance, the housing cost burden of a family can be shown as the median percentage of income spent on housing or as the percentage of households facing a moderate or severe cost burden (Schwartz, 2010). Figure 3 shows the median percentage of income spent by renters and owners from 1973 to 2008. According to this figure, the ratio of median renter income to median gross rent remained quite stable from 1975 to 1987. The highest percentage of median housing cost burdens fell in period between 2003 and 2005 with of about 29% renter's population. In other hand, nearly 34% of home owners, the highest percentage of home owner, having housing cost burden in the period of 1981-1982. After that, this percentage declined rapidly to 20% in the period of 4-5 years. This ratio between owner's median income and median after-tax mortgage payment was changed according to the economy as well as the interest rate at that time. The share achieved lowest value in 1998 with only about 16% of home owners have housing cost burden. After reached about 23% in 2007, it started decrease.

Figure 3. Median Housing Cost Hardens for Renter and Home Owners, 1975-2008



Source: Joint Center for Housing Studies, 2008; Table A1.

1.1.5 Housing Bubble

The U.S. housing market experienced its largest crisis since the Great Depression during the late 2000s. The housing price run-up started in the mid-1990s, increased after 2000 and reached its peak in early 2006. Varying by geographic areas, housing prices rose sharply in the East and West coasts as well as selected metropolitan areas inland. The boom of housing prices took into account changes in mortgage lending, both for home prices and the refinancing of existing mortgage. The easier standard in lending money contributed to the increasing of number of people purchasing new houses speculatively. This easy credit fueled the housing bubble, especially in “hot housing markets” such as Florida or California. The second part of 2006 witnessed the slower increase of housing prices before it dropped in 2007. By early 2008, housing prices had lost more than 10%. As a result, the increasing rate in 2006-2007 among U.S. homeowners led to a crisis in August 2008 for the subprime, mortgage, credit, hedge fund, foreign bank market,

among others. In October 2007, the U.S. Secretary of the Treasury called the bursting housing bubble “the most significant risk to our economy” (AFP, 2007).

1.2 Natural Disaster in the U.S.

Housing is one of the major elements forming built environment in the United States. The alterations of housing stock largely affect built environment status. Besides, built environment and natural disaster share relationship of cause-effect. Whatever would happen when disaster is appeared, built environment is one of the major aspects receiving effect of this event. Consequently, housing also has been affected by hazard in different ways since it occupies large share in built environment. Hence, the relationship between housing and natural disaster in the U.S. has been placed as priority concern for development.

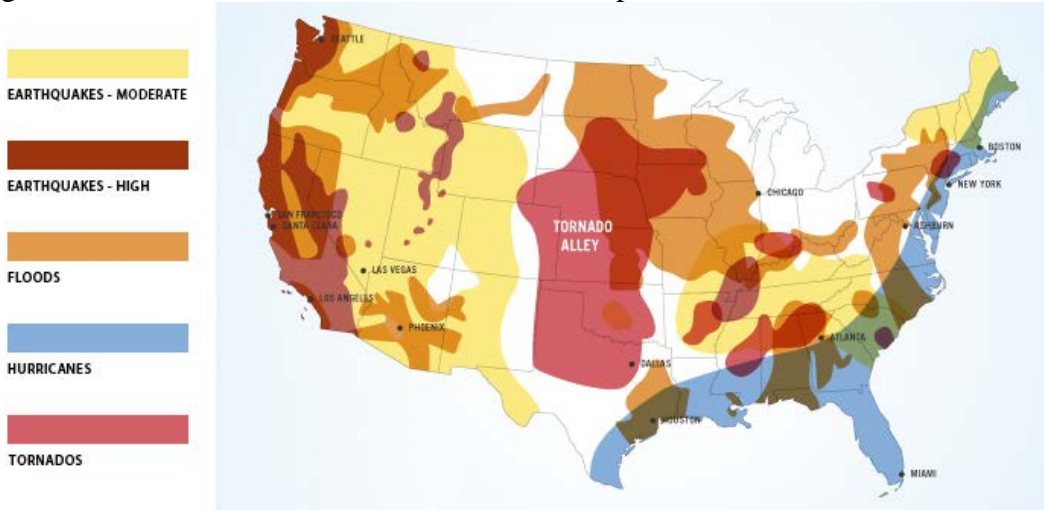
Located in North America continent, United States has long coastal line since surrounded by oceans. Besides, unequal features in topography as well as weather condition place the U.S. facing with different type of natural disasters. This part of paper will indicated some major ones and focusing on hurricane, key threat for coastal community.

1.2.1 General Information

Every year in the United States, natural hazard threatens lives and livelihoods, causing fatalities as well as billions of dollars damage. According to Federal Emergency Management Agency (FEMA) and United States Environment Protection Agency (EPA), there are many types of natural disaster that may negatively affect human lives such as: drought, earthquakes, extreme heat, floods, hurricanes, landslides and debris flow, severe weather, space weather, thunderstorm and lighting, tornadoes, tsunamis, volcanoes, wildfires, and winter storm and extreme cold. Each type of natural hazards has their own characteristics as well as effects. Thus, getting knowledge about natural disaster events as well as keeping in touch with local public information will allow people effectively response to incoming events.

Figure 4 shows location of major natural disasters according to the U.S. territory. The Western area is appeared as high frequency of earthquake with various strengths. In these areas, California and the West coast experienced some devastated earth quakes in history. Besides, Midwest is considered as “Tornado Alley” in the country. Tornado also appears in separate areas such as South of West coast or East South Central. In addition, flood is another natural disaster happened when the water is overflow and expanse submerging the ground. In the U.S., flooding appears in some concave areas around North Central, North of West coast, and North East. Finally, hurricane is one of the costliest natural disasters that affected living condition as well as environment nationally. Hurricane highly activates along the line from Gulf Coast to coastal areas of North East. Due to particular situation, hurricane could cause tornado as well as flooding for the surrounding areas where it approached.

Figure 4. United States Natural Disaster Risks Map



Source: <http://www.crisishq.com/why-prepare/us-natural-disaster-map>

1.2.2 Hurricane

Hurricane is a type of tropical cyclone that formed in the Southern Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and in the Eastern Pacific Ocean. A typical cyclone is operated with thunder storm. In the Northern Hemisphere, the wind in hurricane has counter clockwise circulation near the earth's ground. Not only approach coastal areas but also negatively affect several hundred miles inland. In some cases, hurricanes can produce winds exceeding 155 miles per hours as well as spawn tornados and microbursts. Further, it also can create storm surge and heavy rainfall for coastal communities and well inland. In addition, floods and flying debris caused by hurricane are often deadly and cause destructive results for human lives and buildings. In the United States, coastal area from the South toward North East always stand in the highly risk area with the activity of hurricanes.

1.2.3 Hurricane Damage and Effects

Besides the most dangerous impact of hurricane, storm surge, its winds and heavy rain can be considered as other destructive element of this disaster. In addition, tornadoes that are formed inland later also threat local community where they pass.

- Winds

The winds of hurricane range from 74 mph (the lowest hurricane level) to approximately 155 mph in a catastrophic one. Wind is the major reason that damages structure when hurricane approached. In some case, it easily up root tree, tear down power line, and break roof or window of buildings. Wind speed combines with the speed of the storm creates a devastated movement affect large area in coastal community or inland neighborhood.

- Storm Surge

Storm surge is a rapid rise of water's level that moves into the land when the eye of hurricane creates landfall. The stronger hurricane form, the stronger storm surge will be created. When hurricane approaches coastal line, its winds move the water toward the

shore. This movement rapidly raises the water level since the eye of the storm approaches. Continuous wave hits the coast line with tons of moving water that swipe out most of the structure on the way in the shore area.

- Rainfall-Induced Flooding

The heavy rain that associates with a tropical weather system causes flooding in the area where the hurricane initially hits. More seriously, flooding also affects inland area hundreds of miles from the original place of landfall. And, rainfall becomes more excessive when the storm is large and moving slowly. As the storm move toward inland, it reduces the intensive to become a tropical depression. However, the continued circulation, tropical moisture, and topography can contribute to copious amount of rainfall which is able to cause serious flooding inland.

1.3 Field of Research

1.3.1 History of Public Housing in the U.S.

The federal public housing program was created to support the poorest families in the United States with adequate housing. Back in the early days, this program was designated mainly for the working class. However, the purpose of public housing, financial mechanism, and building morphology changed over time according to the alterations of market. Since the Housing Act 1937 took place, public housing mostly built with small scale as two or three story or garden apartments. These types of development were mainly financed by bond initiatives and operated by setting rents over to cover costs (Stoloff, 2004).

Starting in 1950s, high rise building style gradually replaced old ones in public housing areas. With the development of construction technology, public housing was able to reach the height of 16 stories like in Chicago with the Robert Taylor Homes development. In addition, there were several significant public housing projects in this time such as: Cabrini Green, Chicago, IL; Jordan Downs, Watts, CA; Queensbridge

House, Queens, NY; or Pruitt-Igoe development, St.Louis, MO. According to Stoloff (2004), high rises failed for families, in most case, but served the elderly well.

In general, public housing was run by cooperation between the federal government and local authorities. The rents of low-income households were subsidized by the federal government's financing of the development. In addition to that support, local authorities took charge of maintaining the buildings and facilities by the revenue from the rents. This financial mechanism worked well until the 1960s when the pool of tenants became too poor to sustain it (Von Hoffman, 2012). Therefore, the rents which tied to households' income became the most burdensome issue for low-income families. The gap between low income and high rent cost was enlarged, which led to the deterioration of many public housing units in this period. Today, instead of directly financing public housing development, the federal government uses other financial mechanisms such as the low income housing tax credit program (LIHTC) to achieve similar goals of providing homes for low income families.

1.3.2 General Issues of Public Housing

From the view point of business and political leaders, local housing conditions were fundamental issues that affect resident and community. Clearing and replacing slums was one of the major goals of public housing which was considered as new hope for residential as well as local authority. However, the public housing showed the draw back in its system because of serious bureaucracy that would plague it in later decades (Von Hoffman, 2012). The United States Housing Authority (USHA) sent local housing authority a myriad of regulations related to running public housing program such as construction cost ceilings, limits on tenant incomes, and even architectural style requirement. In response to such tight criteria, local housing authorities created a standardized version of modernist architecture executed with particular type of material. This particular standardized form made public housing easily to be recognized, and in doing so, stigmatized poor people's housing.

In addition, public housing experienced different types of issues related to segregation, crime, or poverty. According to Griffiths and Tita (2009), the high rate of violence in public housing results by the combination of a built environment that inhibited social control (Newman, 1972; Newman and Frank, 1980) and a social environment that limited social interactions between residents and the outside society (Massey and Denton, 1993; Wilson, 1987). These indicated the situation that public housing had to deal with in terms of harmonized local residents with broader environment. Clearly, the disadvantage of economic and social status make public housing's residents become isolated relative to other communities. The level of social isolation was higher in public housing area in compared to other housing developments. Therefore, people living in public housing area tended to narrow down their social interactions. The awareness of space became unique characteristic of public housing area where residents spent their routine activities close to their home, public housing. However, this introverted trend was an opportunity for distressed problems such as criminals, drug dealers, or gang activities. In turn, these issues affect the overall feeling of community within public housing.

1.3.3 Housing after Disaster

As disaster happen, every aspect of human life has been affected. Housing is one of the most important elements because of its crucial role toward people living condition. For example, many families become homeless after a stormy night since their house has been destroyed by devastated hurricane. This part of the paper will address the issues of housing recovery after natural disaster.

Natural hazards are often thought to be unexpected events. After a strike, recovery is a critical progress that brings households back to normalcy. Recovery may include different experiences including psychological or perceptual measures related to stress, and sense of loss, and recovery including regaining income, employment, household amenities, and household assets (Bolin, 1976, 1982, 1993a and 1993b; Bolin and Trainer, 1978; Bates, 1982; Bolin and Bolton, 1983; Peacock et al., 1987, 2005,2007) More importantly, the overall assessment of household recovery closely related to

reestablishing permanent housing since home is an inevitable for anybody carry out normal activities and establish daily routine (Bates and Peacock, 1987; Bolin and Trainer, 1978; Quarantelli, 1982; Bates and Peacock, 1993; Peacock et al., 2005, 2007).

1.4 Two Case Studies for Research

Catching attention from the public housing debate in Galveston in 2011, author is curious about the story behind that. Housing recovery after hurricane is an inevitable part of revitalization process after disaster events. However, what happen in each place is different due to particular characteristics. Moreover, some processes happen with reverse direction with others. Those are the case of public housing after hurricane in Beaumont and Galveston, Texas. They share the same situation of being damage by devastated hurricanes. Housing stock in both cities has received negatively affected by storm while the shortage of affordable housing was their temporary problem. And, they both work in recovery process in order to rebuild public housing for low income people. However, the results of their efforts are totally different. While Beaumont has a successful revitalization program with public housing after hurricane Rita, Galveston stuck in a debate about public housing's redevelopment plan. Housing authority in Galveston tried to create the most appropriate redevelopment plan for public housing while local community and some conservative city councilmen opposed bringing public housing back to the island.

The author is inspired by the issues of public housing in two case studies and hopes to look up the evident behind these stories. There are some questions have been raised through the study of both cities. Firstly, the overall change of demography in entire two cities is expected to find by looking at the data before and after hurricane. Secondly, the process of rebuilding public housing in each city might suggest the reason leading to redevelopment plan. In addition, by looking at closely at public housing area through various topics and data set, the author hopes to find quantitative evidences that support to what happen in both cities. The latter part of this paper will indicate two case studies with population data set in order to find the responses for above concerns.

1.4.1 Beaumont and Hurricane Rita (2005)

Hurricane Rita was the fourth most intense Atlantic hurricane ever recorded as well as the most intense tropical cyclone ever observed in the Gulf of Mexico. Rita was formed near the Bahamas as a tropical wave on September 18 2005. It moved westward, passing through the Florida Straits, reaching wind speed of 180 mph on September 20. It gradually weakened and made landfall at Sabine Pass, Texas with wind speed of 120 mph. On September 26, it degenerated into a large low-pressure area over the lower Mississippi Valley.

Rita had an impact on large area within multiple states including Florida, Louisiana, Mississippi, and Texas. Among those, Texas received the most damage as well as the highest number of reported deaths related to the hurricane. Communities of the “Golden Triangle” formed by Beaumont, Port Arthur, and Orange received enormous wind damage. The situation became so serious that Texas Governor Rick Perry declared a nine-county disaster area. According to the report, 25% of the trees in the city of Beaumont were uprooted by the hurricane. In Bridge City, about 95% of the town was flooded with the water from 2 to 4 feet. Together with that damage, an enormous number of houses and business had suffered damage by heavy wind as well as falling trees and debris in the air. Some areas did not have power for more than a month due to serious damage to city infrastructure (Hurricane Rita).

In 2006, the Beaumont Housing Authority (BHA) was awarded a \$20 million dollars HOPE VI Revitalization Grant from U.S. Department of Housing and Urban Development (HUD). In addition, they also received a \$13.7 million dollar Hurricane Rita Recovery Grant from the Texas Department of Housing and Community Development. Magnolia Gardens, a public housing development, was demolished and replaced with three new mixed-income developments including Regent I, Pointe North, and Regent II. The revitalization of Magnolia Gardens is a critical effort of Beaumont Housing Authority as well as Beaumont’s city council. BHA has done a terrific job by coordinating with the local community in planning process in order to create a valuable new plan for Magnolia Gardens. In response to their enthusiastic effort and contribution,

the new mixed-income development has received unprecedented support from residents, business owners, city government, and other participants.

As a result, the final report evaluating the Magnolia Gardens development highly evaluated the successful of this project due to its positive impact to resident as well as broader communities. The report was executed by Center of Housing and Urban Development (CHUD), Texas A&M University, leading by Dr. Shannon Van Zandt. According to the report, research team had positive conclusions related to the impacts or new development on residents, partnership, neighborhood revitalization, and economic performance (Van Zandt et al., 2012).

1.4.2 Galveston and Hurricane Ike (2008)

In 2008, one of the costliest hurricanes in the U.S approached the Gulf Coast area along the same path of the 1900 storm that hit the city of Galveston. Hurricane Ike was the costliest hurricane in Texas history, with the total damage reaching about \$29.5 billion dollars. Early day on September 4th, Ike was a Category 4 hurricane with a wind speed of 135 mph. It passed over Cuba, leaving the area with huge damage and then reduced into Category 1 by September 7th. It approached Galveston, with final landfall on September 13th have strengthened to Category 2. The hurricane zone extended 120 miles from the cyclone center and the wind force reached even broader area beyond that distance.

The impacts of Ike spread out according to its movement, from Haiti to Cuba then the coastal areas of United States. Ike was blamed for about 135 people were killed and missing in the US only. Ike caused devastation for the large area from Louisiana coastline, to the region near Corpus Christi, Texas.

Hurricane Ike hit Galveston Island and damaged about 88% of the residential units. While the majority had minor damage, approximately 1,000 were substantially damaged. At that time, Galveston Housing Authority (GHA) was managing 990 units of public housing, including 356 units in two high rises for the elderly, 34 scattered sites, 20 new duplexes for the elderly, and 569 family units. According to the GHA's report, more

than half of public housing stock was damaged beyond repair by the hurricane. The City of Galveston declared the 569 housing units at Magnolia Homes, Oleander Homes, Palm Terrace and Cedar Terrace unfit for residential occupancy. Therefore, Galveston Housing Authority planned to demolish the units in 2009. However, Lone Star Legal Aid (LSLA), representing the residents who are displaced tenants of GHA public housing, filed an Administrative Complaint on March 2, 2009 opposing plans to demolish Oleander Homes and Palm Terrace areas. As a result, GHA and LSLA reached a Settlement Agreement on March 13, 2009. The Settlement Agreement specifically required one-for-one replacement of the 569 multifamily public housing units to be demolished by GHA (Galveston Housing Authority, 2011).

Because of the damage that Ike brought, the demand for housing assistance continued to outstrip the supply that the City could provide. Even before the hurricane, Galveston had about 3,000 households on the waiting list for subsidized rental housing. In their plan for rebuilding the 569 public housing units, GHA proposed 390 units to be built on the same footprint of the original housing, and 179 units will be built on scatter-site. However, the opposition toward these recovery plans of public housing was raised among certain constituencies on the Island. Their argument against rebuilding public housing included several reasons. They believe that the City plan to rebuild public housing is not necessary since they already have the lion's share of public housing in the county. In addition, they were concerned that rebuilding public housing would result in an excess number of low-income housing units as well as the low income population on the Island. Opponents also expressed the opinion that their property value will be negatively affected because of the low-income housing stock. Lastly, they argued that the rebuilding process would impact the tourism industry, one of the city's main economic activities.

The debate becomes more serious when the City rejected the plan that GHA had proposed for rebuilding the public housing. Even with the support of Mayor Joe Jaworski to rebuild public housing as a mixed-income community following the HOPE

VI model, Galveston City Council voted 4-3 to reject the plan. Some floated a resolution calling on the state to deny federal tax credits for low-income housing in Galveston.

State officials threatened to force the City to repay \$56 million in disaster funds if it failed to come up with a plan to rebuild public housing damaged by Hurricane Ike. This announcement from HUD through the Texas General Land Office also mentioned halting the payment of \$586 million in disaster funds and \$5.56 million in other grants if the deadline was not met.

1.5 Research Questions

Given the two case studies in Beaumont and Galveston, this research is concerned with several research questions:

- What are the issues of public housing and specifically of public housing in post-disaster period?
- What are the differences between the two cities in term of demography and housing stock before and after disaster events?
- How can a city successfully / not successfully rebuild public housing in post disaster?
- What is the role of local politics in affecting the recovery of public housing?
- How can planners contribute more for the housing opportunity for low income people in post disaster period?

2 LITERATURE REVIEW

2.1 Public Housing

Starting in 1937, public housing was a program introduced by federal government. This program was provided public financing for multi-family units that serve low-income people. This part of the paper focus on four major elements that directly related to public housing development: target population, site selection, and financing (Hays, 1995; Stoloff, 2004)

2.1.1 Target Population

Public housing was originally built to house the segments of the working class, not “the poorest of the poor” (United States, 1937; Bauman, 1987; Atlas and Dreier, 1992; Marcuse, 1995; Stoloff, 2004). During the Depression, the submerged middle class could not join the labor market because of economic decline. Public housing was designated to support the demand of living for these people since they were unable to afford the market rate cost for housing.

The population of public housing gradually changed after World War II when many working class people were able to purchase their own home through the supporting of low-interest mortgages program. However, Massey and Denton (1993) documented that this policy possessed discrimination which mainly support white-working class people. Many of them had a change to move out of public housing inner city and settled in suburban areas. Through this time, the majority of public housing residents were African-Americans living in cities and inner suburbs.

Public housing was considered as a remedy for inner city poverty and isolation, and as a basic human necessity for less well-off people (Riis, 1890; Marcuse, 1986b; Stegman, 1990; Stoloff, 2004). Public authorities and residential see public housing as a way of ensuring the decent, affordable housing should be available for all households in the U.S. The terrible condition of tenements where immigrant lived was one of the reasons that Housing Act 1937 focused on slum clearance. This legislation provided replacement

of tenements by “low-rent-housing” and the target population is determined as families of low income. The only one requirement for qualified tenant is related to their income. The screening mechanism required tenant’s incomes to be no higher than five times the rental cost of the unit and six times with family having more than two children. In the early time of public housing development, people supported this requirement since they believe that having employed resident would ensure the success of the housing development (Bauer, 1957; Spain, 1996; Stoloff, 2004). More policies were applied to public housing residents in years later to maintain the quality as well as reduce the overload of public housing structure.

In the late 1960s, incentives were introduced more to support the private sector’s involvement in the development of low-cost housing. These incentives included low-cost mortgages, tax breaks, and rent subsidies for house the poor (Atlas and Dreier, 1992; Stoloff, 2004). Orlebeke (2000) stated that this direction of housing policy was changing away from supply-based mechanism to subsidizing private development and demand-based systems such as housing vouchers.

In 1981, rent ceilings were eliminated in public housing. This change made it less attractive to higher income residents. In addition, congress established standard deductions for public housing residents who are minor, elderly heads of households, and for other allowable expenses (Feins, Merrill et al., 1994; Stoloff, 2004). The trend of reducing control by the public housing authorities was applied. Instead, public housing population gradually shifted toward group of people who are a more disadvantaged segment of society.

In the decades that followed, public housing residents depended more on local housing authorities since they were able to apply additional criteria or preference for their housing policies. For example, many of local housing authorities have flexibility in payment schedules for residents since most of them still pay about 30% of their adjusted income for rent.

2.1.2 Site Selection

Initially, the location of public housing development was totally under local control. Until 1960s, the federal government had to interfere with many of the issues related to discrimination in site selection which was conducted at the local level. Stoloff (2004) wrote that racial segregation in public housing, perpetuated by site selection systems, was the norm and reflected the larger pattern of residential segregation in the U.S. at that time. For example, many of public housing projects were located at specific area where a particular racial community was already living (Bratt, 1986; Marcuse, 1986a; Massey and Denton, 1993; Stoloff, 2004). This phenomenon happened in almost every big urban area like Chicago or New York City.

Urban renewal is a major period that directly affected the location of public housing in the U.S. Starting with the Housing Act of 1937, slum clearance became more concentrated with the Housing Act of 1949. Together with the declining involvement of the public sector in private housing development, the replacement of demolished slums mainly served the business interests of private developers. According to Teaford (2000) urban renewal was initiated with Title I of the Housing Act 1949 and it made large-scale slum clearance possible without any requirement related to replacement of those units. The primary reason is that Title I did not mandate the rebuilding of public housing after the clearance of slums. The 1949 Housing Act required 810,000 units of public housing be built. However, only 10% of that number was under construction by December of 1951 (Stoloff, 2004). In 1954, the federal Housing Act called for public housing to be built only in the slum clearance area and urban renewal area. This explained why new public housing could not meet demand since they could not increase the housing supply for low income people. More importantly, this progress troubled low income people who were former slum dwellers. Many of them waited for the promise of rebuild new housing to replace slum areas.

2.1.3 Financing

Public housing development and financial issues always go together across different period, from construction to maintenance processes. Since the first Housing Act, the federal government gradually reduced the funding for public housing development. In 1937, the public sector only funded the capital cost and the cooperation, with renters responsible for paying operational and maintenance costs during the development period (Schill, 1991; Stoloff 2004). The cost of public housing development was raising due to the management issues. In 1950s and 1960s, the maintenance cost increased due to the improving inflation rate, increasing expenses, and aging public housing stock. Hays (1995) indicates that by compounding rising inflation, tenant incomes declined from 47.1% to 36.9% of the U.S. median income between 1961 and 1970.

Although experiencing financial problems, a small construction boom in public housing still took place in the time of 1969-1970. This event placed public housing under criticism of Nixon administration. As a result, public housing had to take the choice of increasing rental cost as well as reducing services, management, and maintenance costs. In addition, the requirement for renter became tighter in order to be admitted. For instance, their income had to be below 80% of the area median income. Together with those requirements for renters, a very strict interpretation of the legislation was applied (Stoloff, 2004). HUD managed to spend only \$33 million in the total of \$75 million of 1970 funding for operating subsidies to exert control (Hays, 1995; Bauman, 2000; Stoloff, 2004).

In early 1973, the Nixon administration imposed a freeze on almost all federal housing programs to reorganize at a larger-scale. Housing programs were consolidated by the concentration on Section 8 subsidies which are considered as the appropriate replacement for public housing and other housing programs in the U.S. However, the public housing program was reactivated in 1977 and operated until the Carter's administration before ending in 1981 (Stoloff, 2004). Since then, there has been no large scale funding for new public housing program from the federal budget. On the other

hand, local governments have built public housing with the model of scattered site housing since public housing can still be used as a tool for selectively replacing housing. The Housing Choice Voucher program, formerly called Section 8, has received federal housing dollars since 2003. This change ensures the direction of the U.S. government in developing the tenant-based financial mechanism. According to its operation, the recipient pays 30% of their income for rental cost while the voucher covers the difference between that amount of money and the rental price of housing unit. In addition, several programs were introduced by HUD in the late 1990s such as HOPE VI and Moving to Work. These programs are moving toward dealing with the issues of affordability of housing in the US for low income population.

2.2 HOPE VI Program and Impact on Public Housing Development

Begun in 1992, HOPE VI plays fundamental role in the alteration of public housing policy as well as the contribution to the urban development process in the US. The \$5 billion program executes the goal of replacing distressed public housing project by redesigning mixed-income housing and providing housing voucher to support original residents with rental cost. Since 1992, HUD has awarded 446 HOPE VI grants in 166 cities. Up until 2003, there were 63,100 severely distressed public housing units that have been replaced together with another 20,300 units are slated for redevelopment (Holin et al., 2003; Popkin, 2004).

2.2.1 New Decent Development

Distressed public housing properties were characterized by poor design and construction; looming high-rises with barracks-style townhouses. More seriously, housing units were equipped with few amenities and with low quality materials (Popkin, 2004). Therefore, by creating the HOPE VI program, HUD wanted to transform these distressed public housing areas into low-density with mixed-income residents with good design and attractive buildings. Research conducted by ABT Associates, Inc. focused on the characteristics of 13 completed HOPE VI sites across the country. Among these sites, 4 developments had existing buildings were rehabilitated. In the rest of the sites,

some of the original units were demolished and new housing was constructed. All of these developments tried to reduce the density of previous development as well as increase the interaction between public housing and surrounding neighborhood by creating new open space (Holin et al., 2003; Popkin et al., 2004). In Washington DC, successful example of HOPE VI development is apartment buildings of Ellen Wilson Homes. These drab two-story developments were replaced by a new attractive mix of townhouses and detached units. The remarkable achievement of these new projects came from great architectural design that made new buildings blend to the historical Capitol Hill neighborhood. This improvement came from the flexible policy of HOPE VI development that allowed higher per unit development costs than had been spent for public housing before. (Popkin et al., 2004)

2.2.2 Mixed-Income Developments

HOPE VI, with its clear and strong goal of creating mixed income communities based on old public housing has had a fundamental impact on urban development across the country. Suchman (1996) wrote that “HOPE VI could reverse decades of public housing policy that concentrated the poor and gave rise to the full range of physical, economic, and social problems associated with poverty”. A wide range of incomes living in the same community will contribute to the better managed and maintenance as well as good service to all. For example, HOPE VI developments in Atlanta, Charlotte, and Washington D.C. among others incorporate market-rate rental with homeowner housing alongside public housing to create a much wider range of incomes in a single housing development. These mixed income sites offer more amenities in larger units with more innovative design features compared with old ones. Holin et al. (2003) believed that all public housing sites were able to incorporate many appealing design features and therefore could provide more units suitable for large family size. In addition, HOPE VI mixed income housing developments possess advantage that could diversify a project’s cash flow, decreasing its reliance on federal subsidies as a source of revenue for operations and debt service (Popkin et al., 2004)

2.2.3 Leveraging New Resources

Behind the success of mixed income communities that HOPE VI developed, leveraging new resources for funding public housing sites can be considered as a fundamental movement of housing and urban development in the US. By changing in the way public housing had been financed, HOPE VI projects were no longer receiving federal dollars for construction and management. However, this financial mechanism shift allowed housing authorities to be more creative as well as flexible to leverage outside funds for HOPE VI development. According to the rule released in 1996, housing authorities were able to use public housing funds for the purpose of capital improvements. Besides, the rule also allowed local housing authorities to provide public housing capital funding for third party sectors such as private developers.

In addition to HOPE VI funds, public housing authorities and developers could utilize finance from other sources such as Community Development Block Grants (CDBG), HOME funds, city capital funds, Low Income Housing Tax Credit (LIHTC) funds, and private activity bonds (Popkin et al., 2004). The common thing between successful HOPE VI developments was the innovative ways of using these financial sources. This cooperation created a new type of partnership, a financial agreement as well as collaborative mechanism for new development. An example from Chicago represents this trend. The Cabrini-Green development was in a Tax Increment Financing (TIF) district, opening up an additional source of funding (Salama, 1990; Popkin et al., 2004).

2.2.4 Innovative in Housing Management

Together with the movement of new alterations taking place in public housing, management has been positively improved according to new requirement of mixed income communities. Receiving active support from HUD, HOPE VI housing developments executed management arrangements which were focusing on site-based assessment through contracting with the professional management service industry. Starting with the mixed income innovation, HOPE VI diversified communities that not only required housing quality but also service from management as well.

The Interim Assessment of HOPE VI found that a number of the developments in the study were using private management firms. In addition, successful projects always showed considerable management improvements. For example, the St. Louis housing authority brought in private developers built and managed Murphy Park development. More importantly, the housing authority also had an ownership stake in the property (Turbov and Piper, 2004). In Chicago, Lake Park Place site improved its management with better rule enforcement, screening mechanism, and maintain quality of housing project through the collaboration with management companies.

2.3 Recovery After Disaster

HOPE VI is one of the most effective programs that cooperate with local community in dealing with the housing problem after disaster. The criteria of the program focus on supporting mixed income development in order to build a strong revitalization for community. This part of paper will review some major studies related to recovery after disaster in the United States.

Mitigation, preparedness, response and recovery are four major periods related to natural disaster event. Recovery plays crucial role in relationship with response and mitigation phases. It continues the efforts taken in response process and prepares important foundation in order to support mitigation phase of community. Therefore, recovery needs the outside support to effectively deal with the issues in post disaster. According to analysis mentioned above, HOPE VI programs are appropriate resources strengthen the recovery period. These programs possess different characteristics that contribute to the recovery phase. For example, HOPE VI goals include building new decent development with the model of mixed income community. Besides, it also requires the public-private partnership as well as improvement in management of new development. These features of HOPE VI program closely related to what recovery process after hurricane needs to achieve. This part of the paper will focus on different phase of recovery after natural hazard, the role power in this situation and the model of successful recovery program.

2.3.1 Phases of Recovery in Post Disaster

The post-disaster period is significant to reestablish normal life for residents. The recovery period offers an opportunity to strengthen local organizational capacity to facilitate economic, social, and physical development long after the disaster (Berke et al., 1993). In addition, future hazard vulnerability might be reduced if local authorities and people could adjust the physical development as well as policies and regulations. Rubin et al. (1995) stated that the support for hazard mitigation is typically strongest immediately following a disaster. More importantly, long-term community problems can be resolved according to the reconstruction. Clearly, disaster recovery could bring golden opportunities for the local community in increasing affordable housing stock, creating more public facilities, improving transportation quality, as well as expanding the park and recreational system.

There are four phases accordance with a disaster _ mitigation, preparedness, response, and recovery (Rubin et al., 1995). Recovery plays important role in term of continuing the post disaster response and supporting local community's mitigation efforts. Some research conducted by Hass et al. (1997), Mader (1980), Rubin et al. (1985, 1989) among others begins to explore the disaster recovery at the community level during the past two decades. These studies indicate the major impediments that local communities faced in post disaster reconstruction. These issues may appear as different aspect such as local authority were not ready to deal with aid recipients or the funding money did not satisfy the requirements for recovery. In addition, some studies also mention the issues of the exclusion of local involvement from outside donor programs or the conflicts between local authorities and federal or state agencies after the disaster (Berke et al. 1993).

According to the research of Hass et al. (1977) about the redevelopment process in four case studies in the U.S. and Latin America, the period of disaster recovery is “ordered knowable, and predictable.” The four must-take stages that local communities need to accomplish in post disaster include:

- Take emergency responses involving debris removal, provision of temporary housing, and search and rescue;
- Restore public services such as electricity, water, and telephone;
- Replace or reconstruct capital stock to pre-disaster levels;
- Initiate betterment and developmental reconstruction involving economic growth and development of the locale.

2.3.2 The Role of Power in Related to Recovery Activities

The structure of power plays important role in community recovery efforts. Other research in the Caribbean conducted by Berke et al. (1992) and in Midwest of the US conducted by Francaviglia (1978) discovered the relationship between recovery frame work and time with the political power in recovery after disaster. According to these findings, powerful interest groups, especially from business, were able partly control the recovery process in the local community. They could take advantage of recovery aid by pressuring authorities to rebuild first in areas where they have greatest interest. The priority of local authorities' agenda in post disaster may be altered through this group of people. In addition, poorer communities tend to have less effect toward public authority so that they receive more drawbacks in term of receiving recovery aid.

2.3.3 Model of Successful Recovery Program

Korten (1980) developed an experience-based model for accomplishing successful development aid strategies. According to the diagram in Figure 5 (Berke et al. 1993), the strategy comprises three major elements: households, organizations, and programs. These elements are connected together through the relationships and its own characteristics: needs of aid recipients, aid in program design, and organizational capacity of both donor and recipient institutions and groups. The author of the model asserted that efforts would be successful when the recovery program in place was responsive to household demand as well as be built on strong organizations that were able to achieve their goals. The highly compatible among program design, household

demand and the capacities of supporting organizations improve the success of the recovery agenda.

Figure 5. Fit Requirements for Disaster Recovery Planning



Source: Berke, Kartez, and Wenger. 2008. *Recovery after Disaster: Achieving Sustainable Development, Mitigation and Equity* (figure adapted from Korten, 1980).

An excellent example which is able to prove this model was introduced through the research of Mader (1980). The study indicated that reconstruction efforts in response to the 1968 earthquake in Santa Rosa (California) were successful because of the pre-disaster actions allowing local authority to specifically define what type of support they need. Local authority persuaded federal agencies accepting their using of funding for reconstruction to implement a pre-existing downtown revitalization plan. Before the disaster happen, they anticipated that the plan would take about 10 to 15 years for implementation process. However, in some way, the disaster was considered as a unique opportunity for rapidly implementing the plan. The local staff was able to use the plan as the most effective way that recovery aid could bring to the recovery of the city. They not only defined their own goals but also exerted control over the use of incoming resources as well as altered the recovery program to fit the local demand and capacity. In addition, this process achieved national economic development objective as well.

2.4 Housing Recovery Processes after Natural Disaster

As a major element of built environment, housing stock recovery contributes to the revitalization process of local community after natural disaster. This part of paper will review some studies related to housing recovery after natural hazard in the United States.

2.4.1 The Nature of Housing Markets in the U.S.

In the United States, housing is a special good that is provided through a process of trickle-down process. According to Foley (1980), while new housing is provided for people who can afford it, older housing is passed from people who seek better housing satisfying their new requirement. As a common sense, housing market systematically fail when it comes to providing quality housing to low income households. In addition, this failure also negatively affects racial and ethnic minorities (Lake, 1980; Bratt et al., 1986; Horton, 1992; Alba and Logan, 1992; Peacock et al., 2005). Clearly, low-income families, racial and ethnic minorities most likely stay in low quality housing. In addition, these housing developments are often segregated into distressed neighborhood with low-value in property (Stinchcombe, 1965; Logan and Molotch, 1987; South and Crowder, 1997, Peacock et al., 2005). For example, Blacks household meets obstacles from landlord, real estate broker, or customer due to racial discrimination whey buying, renting, or selling a house (Guy et al., 1982; Sagalyn, 1983; Horton, 1992; Feagin and Sikers, 1994; Oliver and Shapiro, 1995, Peacock et al., 2005).

2.4.2 Permanent Housing Recovery after Disaster

In the literature, there is almost no study which focuses on permanent housing in recovery itself. Instead, research pays attention to homeowners and hence partially on owner occupied housing (Peacock et al. 2005). Most of literature put single family housing as a research objective. Besides, the multi-family housing recovery after disaster nearly draws no attention from scholars. Peacock et al. (2005) indicated that “permanent rental housing recovery is even less well researched and is generally limited to households occupying rental-housing units of unknown form”. In addition, the homeless

population is also under-research in term of recovery process after disaster (Phillips, 1996; Wisner, 1998).

2.4.3 Financial Issues in Recovery Period

In the United States, permanent housing recovery mainly depends on the movement of market (Bolin, 1985; Peacock and Ragsdale, 1997; Comerio, 1998; Bolin, 1993b; Peacock et al., 2005). The only one exception that federal government directly involved in management and reconstruction of residential housing was the 1964 Alaskan Earthquake (Kate, 1970; NAS, 1987; Quarantelli and Dynes, 1989; Peacock et al., 2005). Scholars agreed that allowing the market to cooperate with housing recovery in the United States is the efficient way to deal with various problems in post disaster. Haas et al. (1977) wrote that “market is a suitable mechanism in disaster recovery if one wishes to maintain or increase pre-disaster social inequities”.

Permanent housing recovery requires financial resources for repairing and rebuilding construction. In many case, household and family member also play important role in recovery labor, especially in repairing home. Mostly, the financial resource will used to pay for labor as well as expertise for recovery works. There are two primary sources: private and public funding (Comerio et al., 1994; Comerio, 1998; Bolin and Standford, 1991; Wu and Lindell, 2004; Quarantelli, 1982, Peacock et al., 2005). Private funding comprises insurance, family savings, commercial loans, and funds from relatives or friends. On other hand, public funding includes different types of sources such as low interest loans from the Small Business Administration (SBA), grants from Federal Emergency Management Agency (FEMA), funding from the Department of Housing and Urban Development (HUD) delivering as the Community Development Block Grant (CDBG) or HOME program money. Besides the federal program, many states have public funding for recovery agenda as well. In addition, there are also available programs for supporting residents after disaster such as FEMA’s temporary rental housing program, SBA’s rental housing loans, and Section 8 voucher of HUD that support people with rental subsidies or payments in housing market.

2.4.4 Rental Housing Recovery

In post disaster period, rental properties have unique issues in term of recovery from hazard events. After the natural disaster happen, renters are more likely to be displaced since they have no control to the property ownership. In term of financial support, renters are limited in receiving insurance to cover their assets (Kunreuther and Roth, 1998, Peacock et al., 2005) or approaching federal programs as mentioned above. In addition, low income households and minority families usually have difficulty to find another living place since the shortage of affordable housing stock, especially the prior to the disaster (Quarantelli, 1982, 1995, Peacock et al., 2005). Therefore, many of them have stayed in temporary housing options instead. More importantly, even when they have chance to move to permanent housing, their settlement will depend on various factor such as transportation, economic resources such as savings, job and family locations, and most fundamental, rental vacancies (Peacock et al., 2005). In addition, because of the bias toward single family housing in United States housing policy, multi-family housing such as public housing received more problems in dealing with the nature of recovery in post disaster period.

3 TWO CASE STUDIES

This part of the study will focus on two case studies of Beaumont and Galveston, Texas. The general information of the cities as well as the hurricanes will be mentioned in order to have clear view about these situations.

3.1 General Information of Beaumont, Texas

According to the Table A2, Beaumont has population in 2010 of 118,296 people with 50,689 housing units. The city land area is 82.8 in square miles with the density about 1,428 people per square mile. In term of race and ethnicity, Beaumont has the proportion of 39.7% Not Hispanic or Latino (N.H.L.) White, 46.9% N.H.L. Black, 13.4% Hispanic or Latino. In term of age distribution, Beaumont population is spread out with 7.3% under 5 years, 24.7% under 18 years, and 12.2% 65 years and over. From this population, there are 51.3% are female.

In period 2007-2011, Beaumont has about 45,073 households with homeownership rate equals 57.6%. In addition, the number of housing units in multi-unit structures accompanies 26.4% of total housing units in the city. The household size is about 2.5 persons per house. \$23,674 was the per capita money income in the past 12 months (2011 dollars). The median household income this period is \$40,073 and 21.6% of population living below poverty level.

In 2007, the total number of firms in Beaumont was 9,943 with 23.8% Black-owned firms. The Hispanic-owned and Asian-owned firms took proportion of 5.3% and 6.0%. From this data, there were about 26.8% of women-owned firms in the city economy. In addition, the merchant whole sales in 2007 equaled \$2.27 billion while retail sale reached \$2.47 billion in the same year. The retail sale per capital in 2007 of Beaumont was about \$22,568. This number greatly exceeded the amount money of retail sale per capital of Texas States in the same year (\$13,061)

3.2 General Information of Galveston, Texas.

According to the data from U.S. Census Bureau shown in Table A2, Galveston has population in 2010 of 47,743 people with 32,368 housing units. The city land area is 41.2 in square miles with the density about 1,158 people per square mile. Galveston has large share of N.H.L. White equally 45%, N.H.L. Black only has 18.6% while one third of the population is Hispanic or Latino origin. In term of age distribution, Galveston population is spread out by 5.9% under 5 years, 19.3% under 18 years, and 13.6% 65 years and over. From this population, there are 48.9% are female.

In period 2007-2011, Galveston has about 21,111 households with homeownership rate equals 48.6%. In addition, the number of housing units in multi-unit structures accompanies 40.5% of total housing units in the city. The household size is about 2.2 persons per house. \$25,526 was the per capita money income in the past 12 months (2011 dollars). The median household income this period is \$37,368 and 22.6% of population living below poverty level.

In 2007, the total number of firms in Galveston was 4,071 with 31.2% of women-owned firms in the city economy. In addition, the merchant whole sales in 2007 equaled \$1.08 billion while retail sale was \$558 million in the same year. The retail sale per capital in 2007 of Galveston was about \$9,808.

3.3 The Hurricanes

3.3.1 Hurricane Rita (2005)

A month after devastated Hurricane Trina approached the large parts of Central Gulf Coast region, Hurricane Rita was the second hurricane of the season reaching Category 5 (on the Saffir-Simpson scale) in the Gulf of Mexico. This is the first time that two Category 5 hurricane approached Gulf coast in the same season. Rita is recorded as one of the strongest storms for the Atlantic Basin with the peak sustained winds reached 175 mph. Rita had weaken during the 36 hours period but still remain the land fall and winds more than 150 miles inland. Significant damages were caused due to the heavily landfall

as well as wind speed of 120 mph along the Texas/Louisiana border. (National Oceanic and Atmospheric Administration-NOAA, 2005)

- Meteorology History

Tropical Storm Rita developed on September 18th 2005 from a tropical depression which had been formed earlier at that day. Over the next 48 hours, the storm rapidly increased to become a Category 1 Hurricane then Category 2 Hurricane at the afternoon September 20th. At the location near Florida coast, the wind of Rita gusted up to 76 mph. Rita rapidly reached category 5 when was located near westward of Gulf of Mexico by the afternoon of the September 21st. The wind speeds at that time was about 165 mph and was continuing to increase.

During the afternoon of the September 22nd, Rita had declined the strength due to the replacement of eye-wall storm as well as the effect of cooler sea-surface temperatures. Rita's wind speed reduced into 145mph and continued to weaken gradually over the next 36 hours prior to landfall. In the following day, Rita was tracked west-northwest and made landfall at the Texas/Louisiana border on the September 24th. At that moment, its intensity reduced to category 3 with sustained winds of 120 mph. In the next 24 hours, Rita rapidly weakened into a tropical depression and no longer exist when was tracked at the border of Arkansas/Missouri.

- Rain, Wind, Storm Surge

As approaching Gulf Coastal areas, rainfall from Rita's outer bands start affecting the Gulf Coast well before landfall. Since tracked toward westward through the Gulf Coast, Rita made heavily rain and wind for the areas where previously were damaged by Hurricane Katrina. Rainfall exceeded 6 inches across a large area of Texas and Louisiana coast as Rita approached ashore on September 24th. New Sabine, TX, the wind speeds was recorded over 120 mph. The central pressure at landfall was recorded as 937 mb (Millibars is a measure of the pressure/weight of the air usually taken as close to the core of the hurricane as possible. The lower the pressure is, the higher the wind is). The minimum pressure that Rita reached was 897 mb, ranking 3rd lowest on record for all

Atlantic basin hurricanes (NOAA, 2005). In New Orleans, storm surge topped 8 feet in coastal areas. Rita caused storm surge at landfall in Texas/Louisiana of 15 feet, flooding coastal communities across the border region.

As Hurricane Rita approached inland areas, it weakened to a tropical storm later on September 24th. At this moment, rainfall became primary concern since it caused different types of damages for community. Rainfall exceeded 3 inches across a large area of Northeastern Texas, parts of Arkansas, Mississippi, Alabama and Louisiana. Flooding was caused as inevitable result of that. In addition, Rita also produced tornadoes affecting some other areas.

- Impacts

Hurricane Rita had affected Beaumont and large region in many aspects such as fatalities, flooding, and infrastructural system, among others. According to the mandatory evacuation that Texas and Louisiana officially had applied, over 3 million residents were able to avoid the damage that Rita affected to the regions. However, Rita had been blame for seven deaths directly and 120 ones indirectly. The number of reported deaths in Texas was dominant with 114 people while Florida, Louisiana, and Mississippi were two, one, and four, respectively. In Texas, there counties whose highest number of people reported death were Galveston (36 people), Harris (55 people), and Dallas (23 people). In Beaumont, there was no fatal damage for local residents caused by Rita (NOAA, 2005).

Flooding occurred along the Texas/Louisiana coastal region from September 24th landfall as result of Rita's activities. Besides, 15 feet high storm surge flooded some areas in Louisiana such as Cameron, Jefferson Davis, Terrebonne, and Vermilion trapping some remaining local dwellers within areas. As Rita tracked through the Straits of Florida, it caused some localized flooding in Southern Florida. In addition, some renewed flooding occurred in New Orleans as an 8 foot storm surge overtopped the repaired levees which were damaged during Hurricane Katrina (NOAA, 2005).

As the result of Hurricane Rita in the Gulf Coast areas, more than one million people had been affected by losing power. The situation remained for several days without electricity. In some cases, local family in Louisiana still had not had power restored from Hurricane Katrina when Hurricane Rita approached. In Florida, about 100,000 people in southern areas lost power as Rita arrived. In general, most power was restored within hours (NOAA, 2005).

Many inner-states highways, major and minor roads were affected by the activities of Hurricane Rita. In some areas near the Texas/Louisiana border, highways were impossible to quickly reopen due to the difficulties that Rita tracked through the areas. In addition, many travelers had been stuck for over 10 hours in traffic jam caused by the massive evacuation mandatory (NOAA, 2005).

Because the strategic location of oil infrastructure in Gulf of Mexico, Hurricane Rita caused a lot of problems for the local, states, as well as national economy. Rita traveled through a dense area of offshore pipelines and oil platforms as well as many large refineries complex inland.

In term of total cost for the damage, Hurricane Rita's affections were less in compare with the amount that Hurricane Katrina or Hurricane Andrew (1992) damaged. According to Knabb et al. (2006), the most recent available estimate by the American Insurance Services Group of the insured property damage in the United States caused by Rita is \$5.63 billion. With uninsured losses, the amount could be equivalence with this number. In addition, \$ 783 million was accounted in insured losses from the National Flood Insurance Program (NFIP). Totally, Hurricane Rita caused the damages costly with about \$12.04 billion (NOAA, 2005).

3.3.2 Hurricane Ike (2008)

Hurricane Ike was formed as a tropical disturbance near Africa at the end of August. After period of strengthen and weaken on the way travelled to Gulf Coast, Ike made its final landfall near Galveston, Texas on September 13, 2008. Ike reached Category 2 at that time with wind speed extended 120 mph from the center and tropical storm winds

far extended far beyond that. Hurricane Ike was the costliest hurricane ever that impacted Cuba, the third-costliest hurricane ever to make landfall in the United States, and the costliest hurricane in Texas history (Berg, 2009).

- Meteorological History

Ike had complex development since its forming near Sudan on August 19. As an tropical wave, it traveled pass Nigeria and Mali then approached the coastal area of Senegal on August 28. On September 1st, the tropical wave gradually intensified a sufficient amount of convection then formed tropical depression. Traveled with changing in its form, tropical depression continued to intensify until it better organized and was upgraded to Tropical Storm Ike. By several times intensifying then stop, Ike had developed then became hurricane on September 3rd. Because of lacking wind shear, Ike started to undergo explosive intensification and was upgraded to a strong hurricane with wind speed reached 115 mph. Ike continued to intensified and developed to a Category 4 whose wind equaled 135 mph with an estimated pressure of 948 mb. By the early morning on September 4th, Ike had reached the wind speed of 145 mph with its peak intensify (NOAA, 2008).

Ike made landfall in Holguin Province, Cuba as Hurricane Category 4 on evening of September 7th before approached Gulf area in 24 hours later. Over the two following days, Ike steadily moved toward Galveston and Houston, Texas with the wind speed of 110 mph. It caused a projected storm surge of a Category 4 height though the wind speed was only at the level of Category 2. Ike made landfall at Galveston, Texas on September 13th. After that, Ike gradually weaken when pass Palestine (Texas), Dallas (Texas), and Little Rock (Arkansas). In Arkansas, it produced tornadoes across the state. On September 14th, Tropical Storm Ike merged with cold air movement from west to east over central United States before dissipated early on September 16th (NOAA, 2008).

- Wind and Pressure

Ike had the estimated maximum sustained winds of 144 mph and minimum central pressure of 935 mb on September 4th. According to aircraft reconnaissance's report, Ike

steadily intensified about 18 hours after leaving the northwestern coast of Cuba. By the morning of September 10th, the report indicated that Ike had two well-defined wind maxima of nearly equal strength. As approaching Gulf of Mexico on September 11th, Ike had the pressure of 944 mb associating with wind speed of 132 mph (NOAA, 2008).

The estimated landfall that Ike made in Texas coastal areas was about 110 mph and the pressure recorded at The Galveston Pleasure Pier equaled 952 mb. Being dissipated, Ike still able to produced strong wind across Ohio Valley toward southeastern Canada. In addition, winds gust to hurricane force were reported at different places such as Louisville, Kentucky, and Cincinnati, Columbus, and Wilmington, Ohio (Berg, 2009).

- Storm Surge and Rainfall

Storm surge associated with activities of Ike entirely affected the United States Gulf Coast. The height level of water was reported as higher than normal in different places along the coastal areas. As growing in size and strength, Hurricane Ike with strong wind and rainfall pushed water toward the coastal line well before its center made landfall near Galveston, Texas.

Maximum storm surge along the coastal areas of Alabama, Mississippi, and southeastern Louisiana was generally ranged from 3 to 6 feet high. Because the concave orientation of the coastline in this region, the highest surge values occurred along the coastal areas of Mississippi and Louisiana east of the Mississippi River. In some particular part of Louisiana such as Shell Beach, the 7.51 feet high storm surge was recorded within coastal neighborhoods. The height of storm surge increased to 10-13 feet near Sabine Pass and Port Arthur, Texas. On September 13th, the storm surge was recorded of 12.79 feet at Sabine Pass, Texas, just as Ike was making landfall at Galveston, Texas. The highest inundation, of at least 10 feet, occurred on the bay side of Galveston Island, the coast of mainland Galveston County, and the northern area of Galveston Island where Ike made landfall (NOAA, 2008).

- General Impacts

In the United States, Ike was the third costliest hurricane in history, after Katrina (2005) and Sandy (2012). The hurricane damage large area including several states: Florida, Louisiana, Texas, Arkansas, Ohio.

In Florida Keys area, about 15,000 tourists had to be evacuated when Ike approached. Along the coast line, some beach erosion on Key West's Smather and Higgs Beaches were produced by tropical storm's effects. Many major commercial flights and cruise ships were temporarily halted due to the activities of Ike.

- Impacts in Texas

On September 13th, 2008, the eye of Hurricane Ike approached Texas coast line and it made landfall at early morning over the far eastern area of Galveston Island. Ike approached Galveston then travelled north up Galveston Bay, along the east side of Houston. Despite the planning and mandatory evacuation, Galveston and surrounding areas authorities could not prepare for large number of individual who had been displaced by Hurricane Ike. A survey done in January 2009 showed that Ike had turned approximately 3,459 families become homeless through stormy nights (Rice, 2009). In addition, nearly 16,000 families in the Galveston-Houston area were living in temporary shelters which were provided under the federal housing programs.

In Houston, downtown area was spared significant damage by wind storm. For example, one of the highest skyscraper in downtown, 75 story JP Morgan Chase building was broken many of its window during the movement of Hurricane Ike. And, the retractable roof of Reliant Stadium, home of the National Football League's Houston Texas was partly destroyed, making the team postpone their home playing game. In regional Texas town, electrical power started being cut off on September 12th in the evening. About 2.8 million to 4.5 million people had to live in the situation without power.

In Galveston, high wave caused by storm wind and surge crashed along the seawall which faced the Gulf of Mexico. On September 12th, the storm surge began over flood the 17 feet Galveston seawall, seriously threaten community inside. Although city

government had declared official evacuation on Galveston, many families still ignored the situation. According to report, there were about thousands of people remained in the Island when Hurricane Ike approached. Serious flooding approximately six feet high spread out the Island, including downtown Galveston. Many public facilities including University of Texas Medical Branch at Galveston were inundated by flooding water. About 2400 employees including 120 faculty members were laid off after Hurricane Ike devastated the island. Besides, tourist attractions were also received serious damaged caused by flooding. (FEMA, 2008)

4 PUBLIC HOUSING IN CASE STUDIES

As housing stock in both cities had huge damage because of the hurricanes, public housing area was received same damage from storms' effects. This part of paper will focus on the case of public housing in each city. More clearly, author will indicate the general information of public housing program in the city as well as mention the housing authority. The damage of public housing will be accessed to show the difficult situation that city and housing authority facing after hurricane. More importantly, this part will also express the efforts of public sectors in order to execute redevelop damaged public housing areas. Finally, the result of recovery works will be addressed in later part.

4.1 Public Housing in Beaumont, Texas

Public housing program in Beaumont is under the management of the Beaumont Housing Authority (BHA). Together with this program, BHA also manages the Section 8 program, the Homeownership program, as well as development activities for housing and residents. Currently, BHA manages five public housing developments, one Section 8 New Construction development and 150 scattered-site single-family homes. According to Table 1, this amount of housing stock adds up to approximately 627 affordable housing units which serve over 1,400 people (BHA).

According to program requirements, residents pay less than 30% of their annual adjusted income for rent. Because of the high demand for affordable housing, BHA's waiting list contains thousands of eligible families who are waiting for their chance to be accepted into the next available public housing unit. Contributing to the long waiting list of Public Housing in Beaumont not only is high demand of local residents but also because of the good quality in living environment that BHA always try to maintain for their residents. There are many amenities available in public housing developments such as: air conditioning, appliances and utilities allowances. In addition, the locations of Public housing developments are additional advantages from the view point of many residents. They are located on bus lines, near schools, churches and shopping outlets. More

importantly, residents living in public housing developments in Beaumont are supported with various social services such as: job training, computer class, or tax instruction.

Table 1. Public Housing Developments in The City of Beaumont, Texas

	Name	Address
1	Tracewood I	4075 Arthur, Beaumont, TX 77706
2	Tracewood II	4935 Concord, Beaumont, TX 77708
3	The Crossing	3705 E. Lucas, Beaumont, TX 77708
4	Northridge Manor	4155 Maida, Beaumont, TX 77708
5	Regent I Apartment	1715 Regent St., Beaumont, Texas 77703
6	Point North	3710 Magnolia St., Beaumont, Texas 77703
7	Grand Pine Court	2935 Texas Ave., Beaumont, Texas 77703
8	Concord Homes	2020 Cottonwood, Beaumont, Texas 77703

Source: Beaumont Housing Authority

4.1.1 Impacts of Katrina and Rita to Housing in Beaumont, Texas

September 2005 became the greatest time that Beaumont Housing Authority had to face in its 59 years of operation, dealing with two primary hurricanes: Katrina and Rita. On September 1st, Category 4 Hurricane Katrina broke levees in New Orleans, pushing thousands of evacuees away from home. BHA staff needed to cooperate with these residents who were seeking temporary shelter from the disaster. Current issue of housing shortage contributed to the situation of refugee that made BHA facing the impossible mission of assisted all evacuees. Section 8 voucher were quickly distributed and public housing vacancy units were filled with Katrina victims. Although BHA staff hard worked in order to collaborate with other cities' housing authorities as well as landlords, the waiting list for both program still quickly double.

Another serious challenge came on September 22nd when Hurricane Rita approaching the Gulf Coast areas. Based on the valuable experiences gaining from last crisis, BHA proactively worked with the City of Beaumont and Jefferson County to ensure that its residents were safely evacuated to different parts of the state several days before the

projected landfall happen. Rita had arrived local area on September 24th with the rank of Category 4 Hurricane. Great damages to the landscape as well as infrastructure were happening to the city. According to Knabb et al. (2006), Jefferson County residents were faced with over 3 million cubic yards of hurricane debris to clean up. From this tragedy, BHA suffered over \$1.2 million in damages including property and appliances. For example, there were hundreds of refrigerators that had to be destroyed because of the electrical out-age. The roof and fence of public housing units were damaged by falling trees.

4.1.2 Difficulties of Beaumont Housing Authority

Hurricane Rita caused greater issue for BHA since the waiting list for public housing was further extended. In addition, BHA needed to support local residents who were seeking for emergency housing as well. The situation of City of Beaumont as well as Beaumont Housing Authority became more serious since the federal and state attention mainly focused on Hurricane Katrina and its major devastated areas in Louisiana. More seriously, BHA was forced to close the waiting list of both the Public Housing and Section 8 Program according to the overwhelming demand in 2006. In addition, the number of families that BHA can service need to be reduce because of the new recommendation from the U.S. Department of Housing and Urban Development (HUD). All of the problems that BHA was facing after Hurricane Rita placed it into a position of innovative alterations not only in finance but also in management (Beaumont Housing Authority, 2005).

4.1.3 Efforts of Beaumont Housing Authority

As mentioned above, the federal government failed to correctly recognize the serious damage that Hurricane Rita had caused to the City of Beaumont. In fact, the adequate financial support that the State of Texas need was about \$1.2 billion. This money was expected to be allocated in order to repair the damaged housing as well as infrastructure in the region. However, the only funding of \$74.5 million was awarded to State of Texas for the recovery agenda. With bold goal of not letting Rita become the forgotten storm,

BHA worked closely with an enormous contingent of local agencies as well as elected officials representing South East Texas. That delegation continued working with a legislator in Austin and Washington D.C. to ensure that sufficient funding would be allocated to Texas to help Beaumont residents, Rita's victims. In February 2007, Congress had heard a rising voice from BHA and responded with an additional \$429 million for financial aid. Although BHA could not immediately receive all they appropriate money they needed, the additional dollars contributed to the recovery processes in order to bring normal life back to Hurricane Rita's victims.

In order to response to new challenges, BHA applied different strategies to be more adaptive with the current situations what they were facing. Many public housing operations had being turned to public-private partnership instead of solely depend on BHA as previously. BHA had conveniently reduced spending in order to react for the budget shrinking. More importantly, streamlining staff had been applied for the new operation demands. Housing officials also received essential training and support through different activities such as workshop or joining national conference. BHA put efforts in various fields and operational manner in order to achieve general goal of providing good living environment for low-income residents (Beaumont Housing Authority, 2006).

4.1.4 Results of Housing Stock in Beaumont after Hurricane Rita

Response to the hard working and innovative operation of BHA, it first successful with public-private partnership came in 2006. BHA received a \$20 million funding from HOPE VI Revitalization program for demolishing the Magnolia Gardens public housing development. A new mixed-income development would be built to replace the aging Magnolia Garden public housing. The 195-unit Magnolia Garden development was located in the North End area where gradually losing its population and economic base. Before Hurricane Rita approached, this public housing development had already been stand with low condition of aging units. The hurricane worsened the situation when damage the roof as well as blew tree and debris toward the buildings. Therefore, BHA decided to take the appropriate action with it, demolition and rebuild new developments.

In order to support the new mixed-income development, BHA purchased additional land from City of Beaumont in order to constructed new developments in two sites: the existing Magnolia Gardens site and new 28-acre site. The new site comprised vacant parcels was located close to the original one within less than a mile. Both sites then had been developed as new, mixed-income communities, with combination of one- and two-story townhouse, garden homes, and walk-up homes. Moreover, 83 single family homes were to be built to sell for individual families. These new developments were not only connected with themselves but also with surrounding areas. In addition to HOPE VI Revitalization grant, BHA also leveraged an additional \$32 million financial aid from the Housing Tax Credit Program and the Hurricane Rita CDBG program to rebuild the North End neighborhood (Landrum, 2006). To ensure the success of these new developments, BHA cooperated with the Texas A&M University's College of Architecture, Department of Landscape Architecture and Urban Planning to develop a neighborhood-revitalization plan. This plan was an essential tool to spur investment and redevelopment in the North End area as well as contributed to the reestablish local neighborhood as a vibrant and growing part of the city.

Beside focused on physical development plan, BHA also concentrated on developing of Community and Supportive Services (CSS) program. By cooperating with public and private service providers, BHA offer local residents with various type of programs in order to support them achieving self-sufficiency. These CSS programs comprised homeownership counseling, childcare, employment training, computer training, economic and small business development, health and wellness service, art and cultural program, among others. According to BHA's agenda, CSS program will be integrated into its existing Family Self-Sufficiency program, supporting the improvement of both local residents as well as housing authority's officials.

4.1.5 Evaluation Report of HOPE VI Project in Beaumont, Texas

One of the strongest evidences that support to the achievement of Beaumont Housing Authority and the City of Beaumont in term of housing recovery was the comprehensive evaluation report conducted by Center of Housing and Urban Development (CHUD),

Texas A&M University, led by Dr. Van Zandt. The report addressed overall changes of HOPE VI project in Beaumont, Magnolia Gardens Development, from the beginning of the project in 2007 to the end in 2011. According to the report, the findings are given in two major parts: direct impacts and spill over impacts. By looking at entire project from the beginning days, interviewing local residents, examining changes in demography and economic structure, the report gave reader a comprehensive picture of the recovery efforts that were executed in Beaumont after Hurricane Rita.

- Impact on Residents

Throughout the surveys conducted with focus group as well as local residents, the report concluded some important findings:

- “Physical redevelopment of the community has been highly successful.”
- “The developments are now becoming communities.”

Importantly, the report had found that social transformation of the developments had also shown extremely positive signs. This is the first time in years of evaluation process, research team had clearly indicated the evidences of communications such as talking and sharing between local residents.

The majority of the population highly appreciates the performance of Beaumont Housing Authority based on their operations as well as efforts to support developments. In addition, the report indicated that “crime and the economy threaten continuing revitalization.” Generally, BHA was offering a consistent as well as satisfactory level of services to local residents. In term of partnership, it cannot be denied the primary role of BHA that directly affected the successful of development through various factors. The research team agreed that “the community partnership fostered by the BHA have the potential to become the most important legacy of this program.”

- Neighborhood Revitalization

By analyzing the data related to demographic, economic, social, and physical conditions, report deeply examined the indirect effects on local community. Although some

indicators showed the drawback of neighborhood revitalization, there are some positive signs were findings. By looking at the Census data 2000 and 2010 to see the pre and post conditions of development area, the research team concluded that “household incomes are up, and poverty rates are down.” Since the general trend of city of Beaumont was declining along different socio-economic indicators, development areas had followed the city trend in term of household income and poverty rates.

In addition, separately research with each development sites had been conducted for clearly views of each case. By collecting the data from census track level, report revealed that “two revitalization sites have experienced somewhat different trajectories.” It showed that the Pointe North development was facing more trouble in term of crime rates and rents in compare with another development.

- Economic Development

New business was being created along the main commercial and retail corridor in the revitalization area. The report took a deeply look into the spill-over effects that new development bring to business owner and their employees. Although the effect of revitalization area on business development was not so strong, there were still some good evidences supporting for the conclusion of “wages are increasing in the revitalization area.” The research team recognized the improvement of jobs in local area which was contributed to general trend of the city economy. This did reflect an enhancement and interested in economic opportunities of revitalization area of investors and businesses. More importantly, the diversity of economy in redevelopment area was encouraging through the fact that several industries had taken place in local area. This is the good sign suggesting that revitalization area were able to attract new industry in order to become resilient economy.

4.2 Public Housing in Galveston, Texas

Galveston Housing Authority (GHA) executes the main goal of providing decent, safe, and sanitary housing, in good repair, to low-income families with an affordable rent. According to the official process, GHA screens applicants for public housing and offer

them a housing unit if they are eligible. After signing a contract, housing applicant becomes tenant of public housing program while GHA acts as the role of landlord. The relationship between HUD, GHA, and tenants is represented in the following figure: (Galveston Housing Authority 2012)

GHA has provided housing to low-income families since 1940. Until Ike approached in 2008, GHA takes responsibility for about 900 units of Public Housing (25 of which are scattered site) and administered 1,213 Section 8 Housing Choice Vouchers (Kerney-Odom, 2009a; Wild, 2009), as mentioned in Table 2. Since then, the total of six public housing developments was constructed from 1940s to 1970s with approximate 1000 units. In 2002, GHA completed Cornerstone Place, a 32-unit subdivision built on the property formerly housing Cedar Terrace Residents. Together with constructing new developments, the old ones also had been modernized according to particular case.

Table 2. Public Housing After Hurricane Ike in The City of Galveston, Texas

No	Name	Address	Total unit	Number of destroy
1	Gulf Breeze	1211 21st Street	199	None
2	Holland House	2810 61st Street	157	None
3	Cedar Terrace	2914 Ball Street	139	All
4	Palm Terrace	4400 Sealy Street	104	All
5	Magnolia Homes	1601 The Strand 5228 Broadway	133	All
6	Oleander Homes	Avenue	193	All

Source: Galveston Housing Authority

4.2.1 Temporary Housing Reaction after Hurricane Ike

Thousands of people had to evacuate when Ike was heading toward Galveston Island. The mandatory evacuation that public authorities executed played an important role in minimizing the fatal damage caused by Ike. However, housing stock and other infrastructure in Galveston have received the angry of hurricane in several days.

According to the damage report of GHA, appropriate 75% of all Galveston housing had been damaged. Thus, days to a week after Ike was dissipated, GHA cooperated with other agencies to prepared temporary shelters for returning residents through the Disaster Housing Assistance Program (DHAP). DHAP was established by HUD and FEMA to assist families who were displaced by Hurricanes Ike and Gustav with up to 17 months of temporary housing assistance. Volunteer of this program had contacted with about 93% of these 51,000 families to notify them of eligible participation in FEMA's rental assistance program. By May 2009, about 13,700 in total of 19,000 families agree to participate have received rental assistance. The other 5,400 are close to signing a contract (Lone Star Legal Aid, 2009; Wild, 2009).

However, there was no clear plan of temporary housing for public housing residents. Ten days after the storm, September 24th, local residents were taken to witness the damage of their living area. They were depressed and had no idea how to deal with the situation of the hurricane had just taken everything away from their property. After stormy nights, they were now being homeless without knowing what to do. FEMA took the necessary reaction by offering these groups of people temporary housing assistance in hotels. Yet, there remained some issues such as residents could not check-in since they did not have credit card. Other people were disqualified for housing assistant because they were not on the name list of tenant in public housing (White 2010).

At the City Council meeting on September 27th, Galveston resident A.W.Colbert raised the concern about housing related issues through series of question: "What about the people coming back? Where are they going to stay? What shelters does Galveston have setup? What about the housing period? City Manager LeBlanc response that he did not have the clearly answer at the moment but he should have them very soon" (White, 2010). This lack of preparation to deal with huge impact from hazard events of City of Galveston can be considered as one of the major issues that delay to completely solve public housing problem months after Hurricane Ike.

4.2.2 Permanent Housing Issues after Hurricane Ike

According to the table about, four public housing developments were nearly destroyed by devastated Hurricane Ike. The total housing unit was 569 were damage by windstorm as well as flooding causing by Ike. The hurricane's impact negatively affected everybody living in the island, especially the most disadvantage groups who were staying in public housing. GHA had worked to provide transitional housing for those tenants who had been displaced by Ike. Through an agreement with Lone Star Legal Aid (LSLA), GHA would take responsibility of rebuild public housing units with the term of 1 for 1. In addition, GHA also promised to focus on providing services for their displaced residents in these developments.

4.2.3 Galveston Housing Authority Housing Development Plans

The Galveston Housing Authority has started a multi-phase development plan to deal with the problems that Ike affected housing stock. In the first phase, GHA focused on demolition of two sites: Oleander Homes and Palm Terrace. These developments had been planned to finish in August 2009. Phase Two that GHA proposed upon completion of phase One comprised the demolition of Cedar Terrace and Magnolia Homes then rebuilt new developments in these areas. In their plan, GHA would built new 569 public housing units in order to replace the 569 damaged ones according to the legal agreement with LSLA mentioned before (Kerney-Odom, 2009b; Wild, 2009). Upon finish these phases, GHA plan to diversify the price range of housing units by integrating moderate and market rate units into new development in order to support mixed-income communities. However, on May 1 2009, the Galveston Housing Authority Broad Commissioners unanimously voted to eliminate Phase Three of GHA's Development Plan. According to the Executive Director Harish Krishnarao, they concerned about rebuilding 569 units for displaced families of public housing. He suggested to looking for another location for these people before finally decided to rebuild public housing at the same places as before Ike approached.

In June 2009, GHA cooperated with Civic Design Associates (CDA) in order to design new development plan. The firm claimed to commit to developing a plan the citizens of Galveston could support (White, 2010). The public housing recovery process attracted a lot of attentions from media as well as local residents. The *Galveston Daily News* support the major voice from local people concerning plan of rebuild public housing in the former area in the island and call for reconsideration of that option. Many strong terms had been used such as “bringing 21st century thinking to housing in Galveston” in order to eliminate poverty concentration as well as converse the distressed situation of public housing into better shape than it was before the storm (Taylor, 2009; Lignon, 2009; Fullen, 2009; White, 2010).

4.2.4 Community and Media Responses toward Public Housing

During the processes of housing recovery in post disaster, Galveston citizens had opportunities to show their concern and voice toward the topic that raised their concerns. Through public or city council meeting, local newspaper not only conveyed the nature of public housing situation but also expressed their ideas and opinions toward this issue. The new redevelopment of public housing plan was designed by CDA received many opposite ideas according to their outcome of the plan for public housing residents. For instance, the *Galveston Daily News* indicated that this is a “public housing’s wrong direction” or another paper wrote “get housing right this time” (Jones, 2009; Taylor, 2009, Mabasa, 2009; White, 2010). Through different meeting, GHA had to revise and rearranged their redevelopment plan to comply with HUD requirements as well as Planning Commission’s approval. For example, developer concern about the site to rebuild Magnolia plan will negatively affected the economic attainment of the area. However, based on the opinion of building new mixed-income communities, GHA believes this will be a great chance to redevelop public housing as well as integrate with surrounding areas through a mixed community. On February 25, 2010, City Council approved the GHA conceptual plan with a 5-2 voted (White, 2010). Previously, these developments were scheduled to finish at the time of one year anniversary of Hurricane Ike in September 2009. Although GHA had already got the conceptual design, a \$25-

million funding from HUD and ready to execute, the way to come back home of low income families stills being challenged with the opposite voices from community.

Some opposed voice raised the concern about the returning of low income people will negatively affect the economic performance. They argued that the city have not enough resource physically as well as financially to support public housing residents. In addition, there were several groups that expressed their opposite opinions toward the public housing redevelopment plan. These groups comprised the Galveston Open Government Project (GOGP), Galveston Alliance for Responsible Development (GARD), Galveston County Coalition for Justice, and the Galveston Alliance of Island Neighborhoods (White, 2010) Although these groups showed their own different ideas toward public housing issues, all of them agreed that rebuild public housing at former locations was not in the Island's best interests.

4.2.5 The Intervention from HUD toward Public Housing Recovery Plan

The debate between public housing advocate and the opposite groups who don't want to rebuild public housing in Galveston struggled until the intervention of United States Department of Housing and Urban Development (HUD). Through the Texas General Land Office (GLO), HUD delivery clearly message for Mayor Lewis Rosen as well as city council: "the city could be required to pay back that fund if program requirements are not met, as well as any ongoing expenditure on infrastructure projects". The total money that City of Galveston may have to return for the federal government reaches \$56 million in disaster fund if they could not finally decided the redevelopment plan for public housing by September 1, 2012. In addition, another letter from Deputy Land Commissioner Gary Hagood had sent to Mayor of Galveston after HUD's announcement. The agency threatened anew to halt the payment of \$586 million in disaster funds and \$5.56 million in other grants if the deadline of September 1st is not met (Rice, 2012). More seriously, one of the HUD assistant secretaries threatened about the possibility of asking the U.S. Justice Department to sue the city:" the debate is over and it's time for the city to move forward to what it has agreed to."

Finally, after one time of extending the deadline, the Galveston City Council had voted 5-2 to adopt the plan avoiding the loss of \$586 million in federal funding for disaster recovery. The dream of having decent affordable housing of former public housing residents in Galveston now pass the only barrier on the way to become true.

5 CASE STUDIES COMPARISONS

5.1 Methodology

These analyzes will be conducted in order to examine the effects of the events in Beaumont and Galveston, Texas. Firstly, the analysis will begin with the demography of two cities using Decennial census data in order to see the general trend of these cities. Besides a detailed data set of public housing area, the researcher will also make use of the economic data to better understand the post-hurricane changes in Beaumont and Galveston. Finally, the housing issues in Galveston will be further addressed through the data set of housing characteristic in American Community Survey (ACS) 3-year estimate.

5.2 General Trends Analysis

The data source used is decennial census data which was recruited from official web site of United States Census Bureau. The happening time of Hurricane Rita in Beaumont and Hurricane Ike in Galveston is respectively 2005 and 2008. Thus, two data sets of year 2000 and year 2010 are used to analyze the general trend of two cities.

Three major demographic data used are: age, race, and housing unit. These data give the overview of economic and social conditions in Beaumont and Galveston when natural disasters such as Rita and Ike took place. By subtracting the number of year later to year before, this paper will analyze how each category change after a decade. In addition, the change in percentage will be used to interpret the result as well.

5.2.1 Age Groups

Table 3 and Table 4 respectively show the age proportion of population in Beaumont and Galveston in 2000 and 2010. While Beaumont only experienced a five-percent decline in population under 18 and in population over 65, population of all age groups in Galveston reduced. From 2000 to 2010, Galveston experienced a substantial decrease of more than 9,500 people, which made up to almost one fifth of this city's population in

2010. From those, population in 2010 of younger than 18 dropped by approximately 31%; the age group from 18 to 34 and over 65 decreased by 13.8% and 17.6%, respectively in comparison with equivalent age cohorts in 2000. According to Exhibit 1, while the constant share between different age groups in Beaumont had been maintained, proportion of age cohort in Galveston underwent significant change in the first decade of the 21th century.

Table 3. Group of Ages in Beaumont, Texas

BEAUMONT, TX	Population 2000		Population 2010		Change	
	Count	Share	Count	Share	Count	Share
Under 18 years	30,852	27.1%	29,269	24.7%	-1,583	-5.1%
18 to 34 years	26,805	23.5%	30,776	26.0%	3,971	14.8%
35 to 64 years	40,990	36.0%	43,859	37.1%	2,869	7.0%
65 and over	15,219	13.4%	14,392	12.2%	-827	-5.4%
Total	113,866	100%	118,296	100%	4,430	(X)

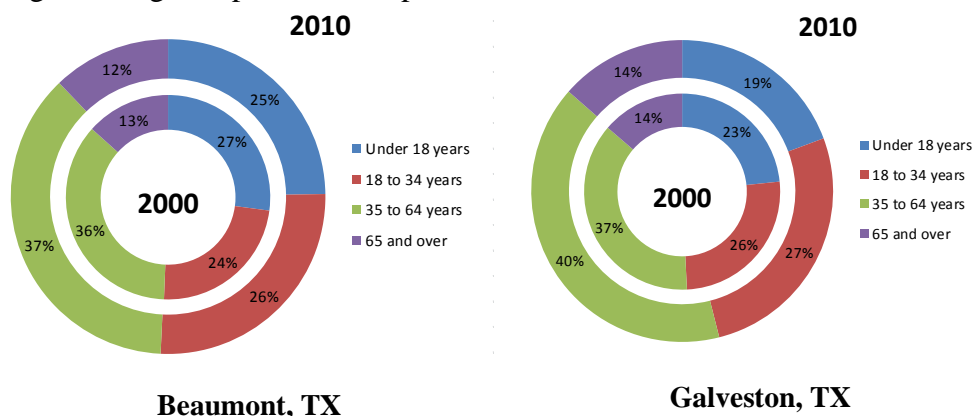
Data Source: Census Bureau 2000, 2010

Table 4. Group of Ages in Galveston, Texas

GALVESTON, TX	Population 2000		Population 2010		Change	
	Count	Share	Count	Share	Count	Share
Under 18 years	13,379	23.4%	9,227	19.3%	-4,152	-31.0%
18 to 34 years	14,796	25.8%	12,756	26.7%	-2,040	-13.8%
35 to 64 years	21,223	37.1%	19,290	40.4%	-1,933	-9.1%
65 and over	7,849	13.7%	6,470	13.6%	-1,379	-17.6%
Total	57,247	100%	47,743	100%	-9,504	(X)

Data Source: Census Bureau 2000, 2010

Figure 6. Age Proportion of Population in Beaumont and Galveston, TX



Data Source: Census Bureau 2000, 2010

5.2.2 Races

Table 5 and Table 6 respectively show the population of different races in Beaumont and Galveston, TX. In Beaumont, Hispanic or Latino population saw the largest increase of 76.1% from 2000 to 2010. Followed by the Not Hispanic Black group with a more modest increase of 6.9%, population of Not Hispanic White decreased by 15% at the same time. In Galveston, together with the overall population decline, Not Hispanic people all decreased in population with the largest drop belonging to Not Hispanic Black group (38%). However, group of Hispanic or Latino in 2010 increased with small a proportion of 1.2% compared to its population in 2000. Through Exhibit 2, two groups which went through the most dramatic change from 2000 to 2010 in Beaumont were Not Hispanic White and Hispanic or Latino. On the other hand, groups of Not Hispanic Black or Latino population in Galveston showed the most alteration in the period of 2000-2010.

Table 5. Race in Beaumont, TX

BEAUMONT, TX	Population 2000		Population 2010		Population Change	
	Count	Share	Count	Share	Count	Share
Not Hispanic White	48,595	42.68%	41,041	34.69%	-7,554	-15.5%
Not Hispanic Black	51,928	45.60%	55,489	46.91%	3,561	6.9%
Not Hispanic Others	4,315	3.79%	5,868	4.96%	1,553	36.0%
Hispanic or Latino	9,028	7.93%	15,898	13.44%	6,870	76.1%
Total Population:	113,866	100%	118,296	100%	4,430	(X)

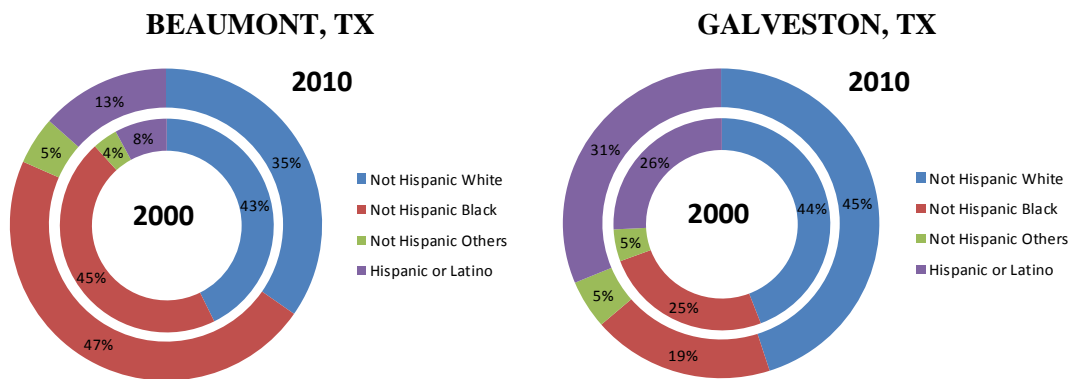
Data Source: Census Bureau 2000, 2010

Table 6. Race in Galveston, TX

GALVESTON, TX	Population 2000		Population 2010		Population Change	
	Count	Share	Count	Share	Count	Share
Not Hispanic White	25,277	44.15%	21,500	45.03%	-3,777	-14.9%
Not Hispanic Black	14,422	25.19%	8,895	18.63%	-5,527	-38.3%
Not Hispanic Others	2,795	4.88%	2,423	5.08%	-372	-13.3%
Hispanic or Latino	14,753	25.77%	14,925	31.26%	172	1.2%
Total Population:	57,247	100%	47,743	100%	-9,504	(X)

Data Source: Census Bureau 2000, 2010

Figure 7. Race in Beaumont and Galveston, TX



Data Source: Census Bureau 2000, 2010

5.2.3 Housing Unit Characteristics

Housing characteristics in Beaumont and Galveston are relatively described in Table 7 and Table 8. In Beaumont, the proportion of occupied units is dominant in the total housing units with approximately 90% from 2000 to 2010. The number of owner occupied units in Beaumont slightly decreased from 26,557 units to 25,788 units in this time. Similarly, Galveston lost 847 owner occupied housing units and gained more than 2,000 rental housing units in this period. In term of vacant units, Galveston also had a large number of this type with about 6,000 in 2000 and 12,400 in 2010. In general, the share of each type of housing in Beaumont was fairly stable with a moderate variation of less than 4%. However, Galveston experienced a more dramatic change during this time. Exhibit 3 clearly shows the loss of about 22.7% in renter occupied housing units while the proportion of vacant units doubled. This number might suggest the relationship between housing stock and natural disasters happening in this period.

Table 7. Housing Characteristic in Beaumont, TX

BEAUMONT, TX	Units 2000		Units 2010		Change	
	Count	Share	Count	Share	Count	Share
Owner Occupied	26,557	54.4%	25,788	50.9%	-769	-2.9%
Renter Occupied	17,804	36.5%	19,860	39.2%	2,056	11.5%
Vacant	4,454	9.1%	5,041	9.9%	587	13.2%
Total	48,815	100%	50,689	100%	(X)	(X)

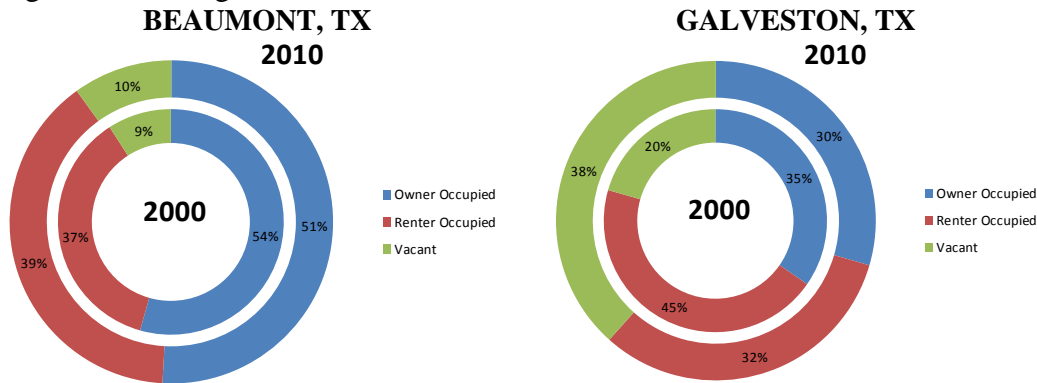
Data Source: Census Bureau 2000, 2010

Table 8. Housing Characteristic in Galveston, TX

GALVESTON, TX	Units 2000		Units 2010		Change	
	Count	Share	Count	Share	Count	Share
Owner Occupied	10,399	34.6%	9,552	29.5%	-847	-8.1%
Renter Occupied	13,443	44.8%	10,391	32.1%	-3,052	-22.7%
Vacant	6,175	20.6%	12,425	38.4%	6,250	101.2%
Total	30,017	100%	32,368	100%	(X)	(X)

Data Source: Census Bureau 2000, 2010

Figure 8. Housing Characteristic in Beaumont and Galveston, TX



Data Source: Census Bureau 2000, 2010

5.3 Public Housing Areas Analysis

In order to observe the general picture in public housing areas as well as their fluctuations between 2000 and 2010, this study conducts equivalent analysis in a city level in terms of age groups, race, and housing characteristics. Gaining access to the location of each public housing development enables the author to precisely indicate in which block groups public housings were located. Then, census data for block group level in each city is accessed through U.S. Census Bureau web site. By adding up data of all block groups that contain public housing developments, the author analyzes basic trend as well as alteration of each topic in public housing areas from 2000 to 2010.

5.3.1 Age Groups

According to Table 9, group of population under 18 and 36 to 64 represented as the most crowded population in Beaumont with 2,771 and 2,744 in year 2000 and 2,717 and 2,663 in year 2010, respectively. Each group shared about one-third of total population residing in public housing areas in Beaumont. In addition, the group of people older than 64 is represented about 10% of total population living there. The groups of ages living in public housing areas in Galveston are indicated via Table 10. In 2000, people younger than 18 was the biggest group comprising 31.7% of total population living in public

housing areas. However, the age group from 35 to 64 became dominant with 35.1% of total population living in public housing area in 2010. Through the Exhibit 4, the change of Galveston's population was depicted clearly while the trend in Beaumont's was quite stable. In Galveston, the shares of group younger than 18 and older than 65 in 2010 declined about 25% in comparison with its population in 2000. On the contrary, group aging from 18 to 34 and from 35 to 64 increased by about 66% and 28%, respectively, with the 2000's public housing population.

Table 9. Group of Ages in Public Housing Areas in Beaumont, TX

BEAUMONT, TX	Population 2000		Population 2010		Population Change	
	Count	Share	Count	Share	Count	Share
Under 18	2,771	33.1%	2,717	32.8%	-54	-1.9%
18 to 34	1,903	22.7%	2,081	25.1%	178	9.4%
35 to 64	2,744	32.8%	2,663	32.1%	-81	-3.0%
Over 65	953	11.4%	833	10.0%	-120	-12.6%
Total	8,371	100%	8,294	100%	(X)	(X)

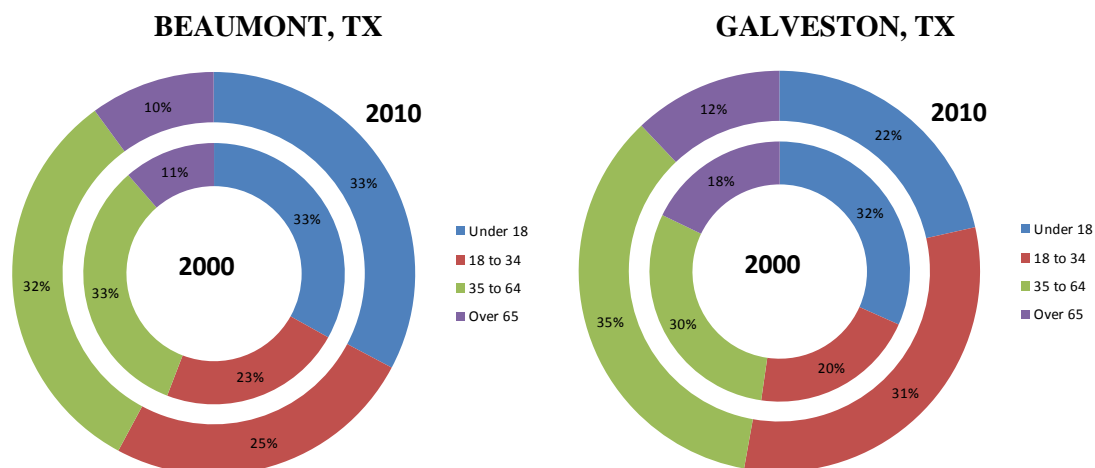
Data Source: Census Bureau 2000, 2010

Table 10. Group of Ages in Public Housing Areas in Galveston, TX

GALVESTON, TX	Population 2000		Population 2010		Population Change	
	Count	Share	Count	Share	Count	Share
Under 18	1,474	31.7%	1,095	21.5%	-379	-25.7%
18 to 34	959	20.6%	1,598	31.3%	639	66.6%
35 to 64	1,390	29.9%	1,791	35.1%	401	28.8%
Over 65	831	17.9%	615	12.1%	-216	-26.0%
Total	4,654	100%	5,099	100%	(X)	(X)

Data Source: Census Bureau 2000, 2010

Figure 9. Group of Ages in Public Housing Areas



Data Source: Census Bureau 2000, 2010

5.3.2 Races

Table 11 shows race data in public housing area in Beaumont. The Not Hispanic Black people took the largest share in total public housing population. In 2000, there were 5,900 people accounted for 70% people living there were Not Hispanic Black. This number increased to 6,107 people, equivalently to 73% of total population in 2010. Furthermore, Not Hispanic White is clearly perceived to be the group bearing the largest drop in in public housing population over this period. In 2010, they declined 607 people equivalent to 34.5% of their population in public housing neighborhood in 2000. In other hand, Galveston race has been shown some changes according to the Table 12. In contrast with Beaumont, Not Hispanic White in Galveston increased in this period from 963 people to 1,579 people while Not Hispanic Black decreased about 540 people represented 22% of their population in 2000. Exhibit 5 clearly shows the difference in trend of multiple races living in public housing areas in Beaumont and Galveston from 2000 to 2010. Although Not Hispanic Black remained the most populated group living in public housing, each city shows reverse direction of changing. While public housing

areas in Beaumont increased from 70% to 74%, Galveston greatly decreased from 53% to 38% of total population living in public housing areas.

Table 11. Race in Public Housing Areas in Beaumont, TX

BEAUMONT, TX	Population 2000		Population 2010		Population Change	
	Count	Share	Count	Share	Count	Share
Not Hispanic White	1,760	21.02%	1,153	13.90%	-607	-34.5%
Not Hispanic Black	5,900	70.48%	6,107	73.63%	207	3.5%
Not Hispanic Others	230	2.75%	190	2.29%	-40	-17.4%
Hispanic or Latino	481	5.75%	844	10.18%	363	75.5%
Total Population:	8,371	100%	8,294	100%	(X)	(X)

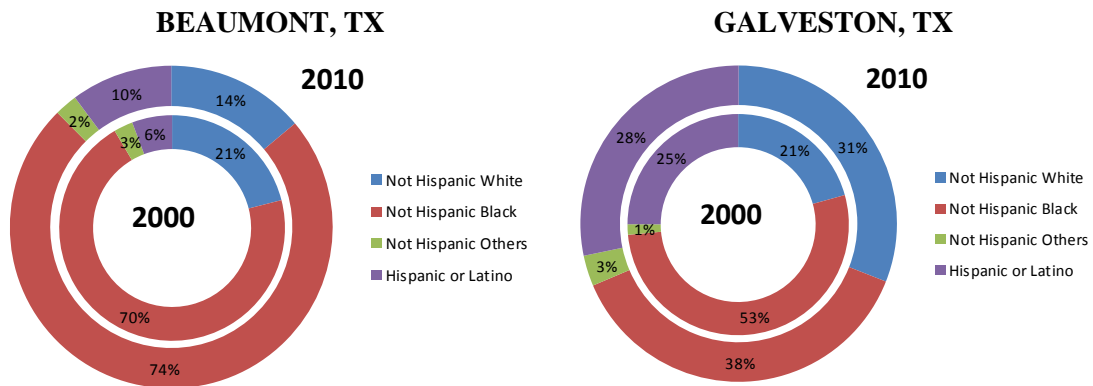
Data Source: Census Bureau 2000, 2010

Table 12. Race in Public Housing Areas in Galveston, TX

GALVESTON, TX	Population 2000		Population 2010		Population Change	
	Count	Share	Count	Share	Count	Share
Not Hispanic White	963	20.69%	1,579	30.97%	616	64.0%
Not Hispanic Black	2,459	52.84%	1,919	37.63%	-540	-22.0%
Not Hispanic Others	71	1.53%	160	3.14%	89	125.4%
Hispanic or Latino	1,161	24.95%	1,441	28.26%	280	24.1%
Total Population:	4,654	100%	5,099	100%	(X)	(X)

Data Source: Census Bureau 2000, 2010

Figure 10. Race in Public Housing Areas



Data Source: Census Bureau 2000, 2010

5.3.3 Housing Units

Table 13 and Table 14 show statistical data of housing characteristics in public housing areas while Exhibit 6 expresses the changing between these categories from 2000 to 2010 in public housing areas in Beaumont and Galveston, TX. According to the data set, the number of owner occupied units in public housing areas of Beaumont reduced by 122 units from 1,511 in 2000 to 1,389 in 2010. At the same time, the renter occupied unit group only saw an increase of 25 units, which equaled to 1.5% of total rental occupied units in public housing area in 2000. More importantly, while the number of vacant units in Beaumont increased 145 units, the equivalent amount in Galveston was 520, approximately 136% of total vacant units in 2000 in public housing areas. Through Exhibit 6, a dramatically change in housing stock in Galveston has been depicted. Renter occupied unit dropped from 62% in 2000 to 45% in 2010 while vacant units increased from 16% to 34%. In Beaumont, there were stable trends except for a slight reduction in the number of owner occupied units.

Table 13. Housing Characteristics in Public Housing Areas in Beaumont, TX

BEAUMONT, TX	Units 2000		Units 2010		Change	
	Count	Share	Count	Share	Count	Share
Owner Occupied	1,511	43.4%	1,389	39.4%	-122	-8.1%
Renter Occupied	1,650	47.4%	1,675	47.5%	25	1.5%
Vacant	317	9.1%	462	13.1%	145	45.7%
Total	3,478	100.0%	3,526	100.0%	(X)	(X)

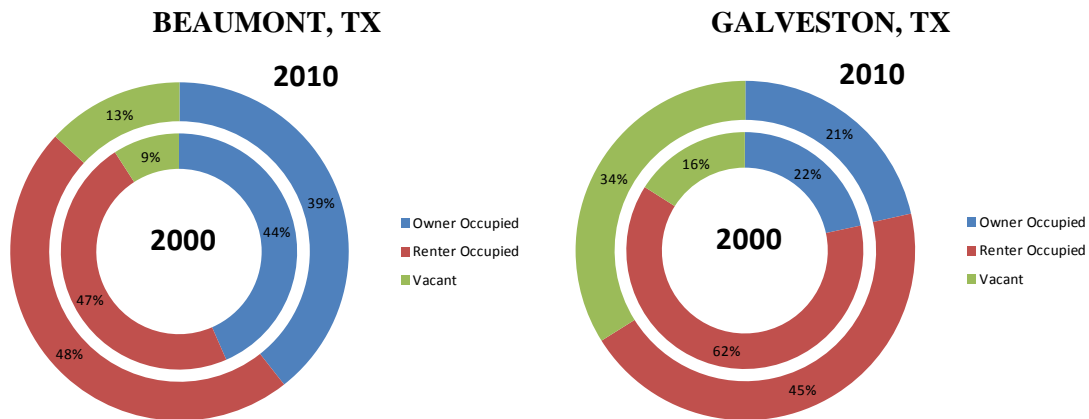
Data Source: Census Bureau 2000, 2010

Table 14. Housing Characteristics in Public Housing Areas in Galveston, TX

GALVESTON, TX	Units 2000		Units 2010		Change	
	Count	Share	Count	Share	Count	Share
Owner Occupied	516	21.6%	572	21.5%	56	10.9%
Renter Occupied	1,489	62.4%	1,186	44.6%	-303	-20.3%
Vacant	382	16.0%	902	33.9%	520	136.1%
Total	2,387	100%	2,660	100%	(X)	(X)

Data Source: Census Bureau 2000, 2010

Figure 11. Housing Characteristics in Public Housing Areas



Data Source: Census Bureau 2000, 2010

5.4 Economic Analysis in Two Cities before and after Hurricanes

5.4.1 Job Earning Analysis

Table 15 and Table 16 show the statistical data about jobs respectively in 2004 and 2006, in Beaumont and Galveston. The category includes different monthly earning jobs such as low wage job, moderate wage job, and high wage job. In Beaumont, all of job categories increased from 2004 to 2006 with a total of about 4,047 jobs. Overall, high wage job experienced the fastest enhancement with more than 2,000 newly increased jobs while low and moderate-wage job shared the same improvement of more than 900 ones. Galveston experienced a different scenario after Hurricane Ike in 2008. Before that, moderate wage job group had the largest share with 40.9% while low wage job compromised only 27% of total jobs in Galveston in 2007. While both of these job groups reduced in 2009, high wage job slightly increased with 115 jobs equally 1.5% of total jobs in 2007. Low wage jobs in Galveston experienced a great lose after Hurricane Ike with more than 1,600 jobs. This reduction equals one quarter of low wage jobs in Galveston at the time of 2007. This decrease suggested the effect of Hurricane Ike as well as its damage towards the low income group in Galveston.

Table 15. Jobs in Beaumont, TX Before and After Hurricane Rita (2005)

BEAUMONT, TX	2004		2006		Change after Hurricane Rita (2005)	
	Count	Share	Count	Share	Count	Share
\$1,250 per month or less	14,863	32.2%	15,783	31.4%	920	6.2%
\$1,251 to \$3,333 per month	18,885	40.8%	19,871	39.5%	986	5.2%
More than \$3,333 per month	12,465	27.0%	14,606	29.1%	2,141	17.2%
Total	46,213	100%	50,260	100%	4,047	(X)

Data Source: U.S. Census Bureau, OnTheMap Application at onthemap.ces.census.gov

Table 16. Jobs in Galveston, TX Before and After Hurricane Ike (2008)

GALVESTON, TX	2007		2009		Change after Hurricane Ike (2008)	
	Count	Share	Count	Share	Count	Share
Jobs by Earnings						
\$1,250 per month or less	6,302	27.0%	4,682	23.0%	-1,620	-25.7%
\$1,251 to \$3,333 per month	9,557	40.9%	8,098	39.7%	-1,459	-15.3%
More than \$3,333 per month	7,482	32.1%	7,597	37.3%	115	1.5%
Total	23,341	100%	20,377	100%	-2,964	(X)

Data Source: U.S. Census Bureau, OnTheMap Application at onthemap.ces.census.gov

5.4.2 Inflow – Outflow Analysis

One of the important features of economic flow analysis is the natural of movement in population in term of joining economic activities. Table 17 and Table 18 show the inflow and outflow of labor force in Beaumont and Galveston before and after disaster events. In Beaumont, the number of people living and working inside the city increased from 27,453 in 2004 to 29,768 in 2006. This phenomenon can be considered as an advantage of redevelopment projects that took place in Beaumont after Hurricane Rita. Clearly, it shows the advantage of urban renewal trend in this area where people can work and live inside the city. Together with the general trend of economic improvement, the number of people working in Beaumont but living outside greatly increased by 7,230 people, equally to 18.1% of the population before Hurricane Rita. Conversely, the number of Beaumont residents working outside marginally increased with approximately 1,732 people from 2004 to 2006.

Galveston shows a totally opposite trend in term of economic movements of the area. The number of people who lived and worked in Galveston declined more than 3,300, or more than a quarter of the previous figure obtained in 2007 before Ike. This trend might as well relate to the previous analysis of the decline in the low wage jobs in Galveston. More importantly, the author believes the issues of housing redevelopment processes greatly attributed to this trend in the Galveston area. In addition, the number of people working in Galveston but living outside as well as people living in Galveston but working outside both shared some minor changes. While the former group decreased by

725 people, the latter group increased by about 357 residents. These changes only equaled to 3.9% and 3.3% of total numbers in the same groups before Hurricane Ike approached Galveston.

Table 17. Work Movement Before and After Hurricane Rita (2005)

BEAUMONT, TX	2004		2006		Change after Hurricane Rita (2005)	
	Count	Share	Count	Share	Count	Share
Employed in Beaumont	67,366	100%	76,911	100%	9,545	(X)
Living in Beaumont	27,453	40.8%	29,768	38.7%	2,315	8.4%
Living Outside	39,913	59.2%	47,143	61.3%	7,230	18.1%
Living in the Beaumont	46,213	100%	50,260	100%	4,047	(X)
Employed in Beaumont	27,453	59.4%	29,768	59.2%	2,315	8.4%
Employed Outside	18,760	40.6%	20,492	40.8%	1,732	9.2%

Data Source: U.S. Census Bureau, OnTheMap Application at onthemap.ces.census.gov

Table 18. Work Movement Before and After Hurricane Ike (2008)

GALVESTON, TX	2007		2009		Change after Hurricane Ike (2008)	
	Count	Share	Count	Share	Count	Share
Employed in Galveston	30,853	100%	26,807	100%	-4,046	(X)
Living in Galveston	12,416	40.2%	9,095	33.9%	-3,321	-26.7%
Living Outside	18,437	59.8%	17,712	66.1%	-725	-3.9%
Living in Galveston	23,341	100%	20,377	100%	-2,964	(X)
Employed in Galveston	12,416	53.2%	9,095	44.6%	-3,321	-26.7%
Employed Outside	10,925	46.8%	11,282	55.4%	357	3.3%

Data Source: U.S. Census Bureau, OnTheMap Application at onthemap.ces.census.gov

5.4.3 Jobs by Distance Analysis

Jobs analysis based on the distance between home and work places has been conducted by collecting the data from census blocks of living areas and working areas in both cities before and after disaster events. Table 19 and Table 20 respectively show the statistical data from Beaumont and Galveston. In Beaumont, together with the general economic

improvement, the job by distance had seen a positive change. According to Table 19, the number of people who traveled fewer than 10 miles to get to work had the largest share of 2,421 jobs within the total of 4,047 additional jobs created in 2006. The size of the group commuting from 10 to 50 miles for working had slightly increased. Similarly, the number of commuter within the radius of more than 50 miles had increased by 1,523. This number equals 14.1% of total number of the same traveling group in Beaumont in 2004.

Galveston experienced a decline in economic activities as we analyzed above. More importantly, the proportion of people who travel less than 10 miles from home to work reduces a quarter or more than 3,300 people in comparison with the year before Hurricane Ike. More than half of people working in Galveston only travelled fewer than 10 miles to work in 2007. The fact that this number had greatly reduced after Hurricane Ike happened suggested the severe effects of natural disasters on the economic and residential life. In a reverse direction, the number of people travelling more than 50 miles to work now increased by 16.7% after Hurricane Ike approached Galveston. This phenomenon seemed to fit in well with the general picture of economic performance as well as redevelopment processes in Galveston.

Table 19. Jobs by Distance Before and After Hurricane Rita (2005)

BEAUMONT, TX Home to Work	2004		2006		Change after Hurricane Rita (2005)	
	Count	Share	Count	Share	Count	Share
Less than 10 miles	29,072	62.9%	31,493	62.7%	2,421	8.3%
10 to 24 miles	5,846	12.7%	5,923	11.8%	77	1.3%
25 to 50 miles	524	1.1%	550	1.1%	26	5.0%
Greater than 50 miles	10,771	23.3%	12,294	24.5%	1,523	14.1%
Total Primary Jobs	46,213	100%	50,260	100%	4,047	(X)

Data Source: U.S. Census Bureau, OnTheMap Application at onthemap.ces.census.gov

Table 20. Jobs by Distance Before and After Hurricane Ike (2008)

GALVESTON, TX Home to Work	2007		2009		Change after Hurricane Ike (2008)	
	Count	Share	Count	Share	Count	Share
Less than 10 miles	12,439	53.3%	9,106	44.7%	-3,333	-26.8%
10 to 24 miles	1,711	7.3%	1,525	7.5%	-186	-10.9%
25 to 50 miles	4,064	17.4%	3,765	18.5%	-299	-7.4%
Greater than 50 miles	5,127	22.0%	5,981	29.4%	854	16.7%
Total Primary Jobs	23,341	100%	20,377	100%	-2,964	(X)

Data Source: U.S. Census Bureau, OnTheMap Application at onthemap.ces.census.gov

5.5 Galveston Housing Analysis

As mentioned earlier, public housing redevelopment processes in Galveston became a center of debate between advocate groups as well as opposite groups. In order to understand more about the situation that public housing fell into after hurricane, this study conducts another analysis which mainly focuses on housing issues in Galveston. The data set has been used to analyzed is American Community Survey (ACS). Two data packs recruited in order to compare before and after hurricane Ike approached are ACS 3-year estimate. The data represented housing in Galveston before Ike is ACS 2007 3-year estimate which includes housing data from 2005 to 2007 in Galveston. With the data showing housing situation after Hurricane Ike, this study uses ACS 2011 3-year estimate data set. Four different topics are used to analyzed include housing unit in structure, housing occupancy, value of owner-occupied housing unit, and gross rent of renter-occupied housing unit in Galveston.

5.5.1 Housing Unit in Structure

Table 21 shows the number of unit as well as the proportion of each type in periods before and after the Hurricane. 1-unit detached housing is the only one that had experienced a great increase in the latter period with about 2,628 units and a margin of error equal to 1,304 units. This improvement in 1-unit detached housing increased the share of this type in total housing unit from 53% to 58.5% with the margin of error of 3.4%. Nevertheless, 1-unit attached housing experienced a slight reduction from 628

units to 616 units. Besides, 2 to 4-units housing group witnessed the largest decrease in total housing. These types reduced from 4,386 units in period 2005-2007 to 3,243 units in period 2009-2011. This change suggests the relationship between redevelopment processes of public housing. The slow recovery and rebuilt public housing are the main factors contributing to the diminishing number of this particular type of housing in Galveston. Moreover, 5 or more-unit housing, also normally utilized for public housing, also experienced reduction before and after Hurricane Ike with the change equals 120 units with the margin of error of 1,421 after Hurricane Ike.

Table 21. Housing Unit in Structure in Galveston, TX

Units in Structure	ACS 05-07		ACS 09-11		Changing after Hurricane Ike (2008)					
	Count		Count		Count			Share		
	Est.	Est.	Est.	Est.	Est.	SE	MoE	Est.	SE	MoE
1-unit, detached	17,669	53	20,351	58.5	2,682	793	1,304	5.5	2.1	3.4
1-unit, attached	628	1.9	616	1.8	-12	182	300	-0.1	0.5	0.9
2 to 4 units	4,386	13.2	3,243	9.3	-1,143	500	822	-3.9	1.5	2.4
5 or more units	10,586	31.8	10,466	30.1	-120	864	1,421	-1.7	2.5	4.12
Others	67	0.2	101	0.3	34	116	190	0.1	0.2	0.36
Total housing units	33,336	100	34,777	100	1,441	669	1,100	(X)	(X)	(X)

Est.: Estimate / SE: Standard Error / MoE: Margin of Error

Data sources: American Community Survey (ACS) 3-years estimate, U.S. Census Bureau

5.5.2 Housing Occupancy

Housing occupancy in Galveston before and after Hurricane Ike is represented in Table 22. From this, it is clearly perceived that the renter units were greatly affected after the disaster happened. The whole group lost nearly 3,000 units with a margin of error equaling to 1,333. This number represented the reduction of approximately 10% (the margin of error of 4.24%) of total housing units in Galveston. One reason for the decline was the inability of public housing resident to come back to their houses due to delays in recovery works. More importantly, the number of vacant units shared a similar change

with rental units yet in a reverse direction. While rental unit reduced, the number of vacant units increased by about 4,180 units with the margin of error 1,075. While owner units slightly increased with a small amount, this change suggests the correlation between the improvement of vacant units and the decline of rental units. Both of these helped explained the trend in the housing stock after Hurricane in Galveston.

Table 22. Housing Occupancy in Galveston, TX

	ACS 05- 07		ACS 09-11		Changing after Hurricane Ike (2008)					
	Count	Share	Count	Share	Count	Share				
	Est.	Est.	Est.	Est.	Est.	SE	MoE	Est.	SE	MoE
Owner units	10,162	30.5	10,364	29.8	202	589	969	-0.7	2.58	4.24
Renter units	13,548	40.6	10,607	30.5	-2,941	810	1,333	-10.1	2.58	4.24
Vacant units	9,626	28.9	13,806	39.7	4,180	653	1,075	10.8	1.86	3.06
Total units	33,336	100	34,777	100	(X)	669	1,100	(X)	(X)	(X)

Est.: Estimate / SE: Standard Error / MoE: Margin of Error

Data sources: American Community Survey (ACS) 3-years estimate, U.S. Census Bureau

5.5.3 Value of Owner-Occupied Housing Unit

In terms of value of owner-occupied housing units, Table 23 represents the deviation after Hurricane Ike approached Galveston. According to the statistic, housing units which cost from \$150,000 to \$299,000 had the largest improvement with a thousand units (the margin of error of 665) in the latter period. While most of housing units which cost more than \$150,000 experienced different increases in terms of number, housing less than \$150,000, however, show a reduction. Especially, housing in the price range of \$50,000 to \$149,000 experienced the most substantial loss with about 972 units (the margin of error of 741). This represents 10% (the margin of error of 6.5%) of reduction in link with the period before Hurricane Ike. These changes express the issue of affordable housing for low income people that Galveston had been facing.

Table 23. Value of Owner-Occupied Housing Unit in Galveston, TX

	ACS 05-07		ACS 09-11		Changing after Hurricane Ike (2008)					
	Count	Share	Count	Share	Count			Share		
	Est.	Est.	Est.	Est.	Est.	SE	MoE	Est.	SE	MoE
Less than \$50,000	925	9.1	750	7.2	-175	184	302	-1.9	1.72	2.83
\$50,000 to \$149,999	5,856	57.6	4,884	47.1	-972	450	741	-10.5	3.95	6.50
\$150,000 to \$299,999	2,704	26.6	3,706	35.7	1,002	404	665	9.1	3.60	5.92
\$300,000 to \$999,999	660	6.5	995	9.6	335	200	328	3.1	1.89	3.11
\$1,000,000 or more	17	0.2	29	0.3	12	26	43	0.1	0.26	0.42
Total housing units	10,162	100	10,364	100	202	589	969	(X)	(X)	(X)

Est.: Estimate / SE: Standard Error / MoE: Margin of Error

Data sources: American Community Survey (ACS) 3-years estimate, U.S. Census Bureau

5.5.4 Gross Rent as Percentage of Households Income

With regards to renter-occupied housing units, Table 24 indicates the change in number as well as share of each type in different periods of Galveston. According to the table, the number of rental units that required payment of more than 35% of renter's income decreased. Two groups that experienced the most reductions are rental units that required households to pay from 15% to 24.9% and 25% to 34.9% of their incomes. The number of former housing group reduced by 1,403 units with the margin of error equal to 790 while the latter group decline 1,489 (the margin of error of 742). In contrast, the improvement of renter-occupied units which required renters to pay 35% or more of their income has increased. According to Table B4, the number of this type of unit increased approximately by 685 with the margin of error equal to 937. This change happening after Hurricane Ike approached Galveston expresses the situation of low-income people as well as the improvement of housing units that had become more expensive for renters in comparison with the period before hurricane.

Table 24. Gross Rent As a Percentage of Household Income in Galveston, TX

	ACS 05-07		ACS 09-11		Changing after Hurricane Ike (2008)					
	Count	Share	Count	Share	Count			Share		
	Est.	Est.	Est.	Est.	Est.	SE	MoE	Est.	SE	MoE
Less than 15%	1,440	10.6	565	5.9	-875	254	418	-4.7	2.15	3.54
15% to 24.9%	3,280	24.3	1,877	19.7	-1,403	481	790	-4.6	3.75	6.17
25% to 34.9%	3,122	23.1	1,633	17	-1,489	451	742	-6.1	3.72	6.13
35% or more	4,802	35.4	5,487	57.4	685	570	937	22	4.04	6.65
Not computed	904	(X)	1,045	(X)	141	261	430	(X)	(X)	(X)
Total rental units	13,548	100	9,562	100	(X)	803	1,321	(X)	(X)	(X)

Est.: Estimate / SE: Standard Error / MoE: Margin of Error

Data sources: American Community Survey (ACS) 3-years estimate, U.S. Census Bureau

5.5.5 Gross Rent Monthly of Rental Housing Unit

Table 25 contains statistical data of rental housing units in Galveston in two periods: before and after Hurricane Ike in 2008. In general, total rental housing units decreased approximately 3,563 units with the margin of error equal to 1,303. This change revealed the current shortage of affordable housing for low income people. More importantly, the great reduction of renter-occupied housing units could be well associated with hurricane's damages. At the moment of conducting ACS 2011 3-year estimate, Galveston was still stuck in public housing redevelopment processes. Therefore, the statistical number strongly indicated how serious the delay of rebuild public housing could affect rental housing stock in the Galveston. According to Table B5, while only rental housing with gross rent of more than \$1000 increased, all other types of rental housing units experienced decreases. Rental housing with gross rent from \$500 to \$999 show the greatest reduction of 2,686 units with the margin of error equal to 1,155. These statistic data further confirmed the negative effects of lacking public housing or other type of rental housing units for low-income people living in Galveston after Hurricane Ike.

Table 25. Gross Rent Monthly of Rental Housing Unit in Galveston, TX

	ACS 05-07		ACS 09-11		Changing after Hurricane Ike (2008)					
	Count	Share	Count	Share	Count			Share		
	Est.	Est.	Est.	Est.	Est.	SE	MoE	Est.	SE	MoE
Less than \$200	344	2.5	85	0.9	-259	122	201	-1.6	1.0	1.6
\$200 to \$499	2,124	15.7	1,038	10.4	-1,086	375	617	-5.3	2.9	4.9
\$500 to \$999	8,750	64.6	6,064	60.8	-2,686	702	1,155	-3.8	5.2	8.7
\$1,000 or more	1,870	13.9	2,798	28	928	399	657	14.1	3.3	5.4
Total rental units	13,548	100	9,985	100	-3,563	792	1,303	(X)	(X)	(X)
Median (dollars)	717	(X)	791	(X)	74	21	35	(X)	(X)	(X)

Est.: Estimate / SE: Standard Error / MoE: Margin of Error

Data sources: American Community Survey (ACS) 3-years estimate, U.S. Census Bureau

6 SUMMARY AND DISCUSSION

Through four different analyses, the results have shown the correlation between developed trend of city and public housing areas. Besides, the data sets also reveal quantitative correlation between social and economic alteration in both cities. These changes somehow can reflect the situation of public housing recovery in case studies.

6.1 Similarities

6.1.1 General Trend in City Scale

In term of general trend in city scale, both Beaumont and Galveston experienced the increase in Hispanic or Latino population from 2000 to 2010. While this group of ethnicity only increased from 8% to 13% in total population of Beaumont, the same group in Galveston, on the other hand, substantially increased from 26% to 31% from 2000 to 2010.

With housing unit characteristics, both cities saw a trend of reducing owner-occupied housing units and increase vacant units. While the change of owner-occupied units in both case studies shared the same pace (about 4-5%), the vacant units in two cities increased at different speeds. This factor will be indicated in the differences between two cities below.

6.1.2 General Trend in Public Housing Areas

As the same trend of city scale, public housing areas in Beaumont and Galveston have increased, especially with regards to the Hispanic or Latino population. While Beaumont's Hispanic or Latino group increased from 6% to 10%, Galveston's increased 25% to 28%.

In term of housing unit characteristics, public housing areas in both cities suffered from a reduction in owner-occupied units and vacancy. In Beaumont, the number of owner-occupied units reduced from 44% to 39% in public housing areas. Similarly, public housing areas in Galveston had a slight decrease in owner-occupied housing units by

1%, down to 21%. These similarities in public housing areas of both cities helped illustrate the normal trend in low income area.

6.1.3 Economic Factors Before and After Hurricane

Job distribution is the first and the foremost factor of the economic status that is analyzed in order to see how it changed after hurricane happened. Beaumont and Galveston shared the improvements of high wage jobs (more than \$3,333 a month) proportion after hurricane happened. While Beaumont created 17% more of high wage jobs, increasing the total number to 2,141 jobs, Galveston slightly increased by only 1.5% with 115 jobs.

In term of work commuting, the number of people living inside the city and working outside in both cities had increased. While this group in Beaumont increased by 9.2% equally 1,732 jobs, Galveston's increased 3.3% with 357 jobs.

Job distance is another important factor which is directly related to social and economic status of both cities. The number of jobs that required people to travel more than 50 miles to work kept increasing in both cities. This number in Beaumont equals 14.1% or 1,523 jobs while in Galveston is 16.7% or 845 jobs, respectively.

6.2 Differences

6.2.1 General Trend in City Scale

In term of general trend in city scale, race proportion in Beaumont and Galveston experienced reverse movements. In Beaumont, the population of Not Hispanic or Latino (N.H.P.) White reduced from 43% to 35% in the period of 2000-2010 while the group of N.H.P. Black slightly increased by two percent in the total population. On other hand, Galveston had reverse trends when being compared with Beaumont. While the N.H.P. White marginally increased, the population of N.H.P. Black reduced from 25% to 19% in the period of 2000-2010. These alterations show the difference in race and ethnic trends in two case studies.

With housing unit characteristics, although Beaumont and Galveston shared the same trend on increasing the number vacant units, their paces are completely different. While it only increased by 1% from 9% to 10% in Beaumont, the number of vacancy in Galveston almost doubled from 20% to 38% in the period of 2000-2010. More importantly, the difference in renter-occupied housing unit also contributed to the trend of both cities. While Beaumont had the increasing of 2% from 37% to 39%, Galveston experiences great reducing in this group with the change from 45% to 32% in the period of 2000-2010. These differences in two case studies can be considered as the evidences contributing to the change in public housing development.

6.2.2 General Trend in Public Housing Areas

Race and ethnicity in public housing areas in Beaumont and Galveston experienced different trends. While Not Hispanic or Latino (N.H.L.) White in Beaumont reduced from 21% to 14%, Galveston increased this group of population from 21% to 31%. Besides, Beaumont also experienced an increase in the population of N.H.L. Black from 70% to 74% while this group in Galveston greatly reduced from 53% to 38% in total population of public housing areas.

In terms of housing unit characteristics, public housing areas in Beaumont and Galveston experienced different changes. The renter-occupied units in Beaumont had a minimal increase from 47% to 48% of total housing units in public housing areas. On the other hand, public housing areas in Galveston greatly reduced renter occupied units, from 62% to 45%. Besides, while vacancy in public housing area in Beaumont only increased by 4%, this number in Galveston doubled from 16% in 2000 to 34% in 2010. These evidences directly reflected the situation of public housing development in two cities. While Beaumont successfully rebuilt public housing after hurricane, Galveston could not agree for the final redevelopment plan.

6.2.3 Economic Factors Before and After Hurricane

In terms of Job distribution, Beaumont and Galveston experienced different changes after the hurricanes. In Beaumont, low wage (less than \$1,250 monthly) and moderate

wage jobs (\$1,251 to \$3,333 monthly) increased about 5-6% with about 950 jobs. In contrast, Galveston greatly reduced in low wage job with the number of 1,620 jobs equal to 25.7%. The moderate wage jobs here also reduced by about 15.3%. These differences show the reverse economic status in two case studies.

In terms of work commuting, the most important factor is the number of people who live and work inside the city. While this number in Beaumont had increased by 8.4% equivalently to 2,351 jobs, Galveston has reduced this one with more than 26% or 3,321 jobs.

The number of jobs related to distance from employee's home in both cities also show different changes after the hurricanes. While the number of jobs that required people travel less than 50 miles has increased in Beaumont, this one in Galveston has reversely reduced. From these, Beaumont had great improvement of jobs with which employees only travel less than 10 miles (2,421 jobs or 8.3%). However, this number in Galveston has reduced by 3,333 jobs (26.8%). These differences suggest the close relationship between economic performance and redevelopment process after the hurricanes in both cities.

6.3 Discussion

Natural disaster is unexpected event happening out of human control. However, with nowadays technology, we are able to predict as well as proactive with preparations in order to minimize the damage caused by natural disasters. However, after they happen, the process of recovery plays a critical role in bringing people back to normal life. What happened in Beaumont and Galveston are regarded as two interesting stories. Both cities suffered from severe damages caused by some of the most devastated hurricanes in Texas history. Beaumont was not hit directly by Hurricane Katrina or Hurricane Rita as Galveston was, in the situation of Hurricane Ike. The impacts levels that hurricanes affected both cities varied according to their own features and their reactions to the events.

Beaumont was really an opportunity-catcher when wisely dealing with the situation of the city especially housing stock after Hurricane Rita dissipated. Although the public housing areas in Beaumont did not experience as huge damages as Galveston did, Beaumont still planned to rebuild the old public housing areas based on the nature of recovery processes after the disaster. The changes that Beaumont brought to ground for public housing areas as well as surrounding communities are considered as one of the most successful urban renewal achievements. They did not only achieve the goal of recovery after disaster but also turned this opportunity into a great catalyst for housing development. The success of Beaumont Public Housing redevelopment came from different elements. They had a clear plan with careful preparation, strongly support from the city as well as residents and most importantly, a great housing authority that understood the situation and knew how to realize the goal with flexible strategies as well as passionate willingness. This strong factor turned the hurricane into an opportunity for urban renewal that supported mixed-income developments.

Conversely, Galveston experienced a more depressing situation after Hurricane Ike. What happened in Galveston distressed every element of the whole redevelopment efforts. First and foremost, the public housing residents were the most distressed subjects since they lost everything because of the natural disaster. Many of them became the victims of hurricane damages which negatively affected their life, work, and properties. More seriously, they were unable to come back to their places because of others' opinions. This clearly was not fair with the most vulnerable group in population. In addition, what happened in Galveston after Hurricane Ike also affected local resident who were not public housing dweller. They had to spend their time and efforts in order to protect their opinions toward redevelopment of public housing. The author believes that many of them had to work extra hours as well as spend additional money for their debating. Besides the public housing resident group, the public authority was affected by the hurricane as well. These effects stand out-side the normal curriculum of recovery process. They are in the middle of two sides who shared reverse opinions towards public housing redevelopment after hurricane. These conflicts factored to the public authority's

delay in recovery work. It not only affected the victims of hurricane but also the city in general since public works had been postponed due to deferred decisions. Last but not least, federal programs are another element that has been negatively affected by Hurricane Ike. They are forced to become involved in the debated of public housing in Galveston. In order to pursue the general goals of affordable housing and social equity, public programs needed to intervene with this debate. Clearly, if the problem had not been existed, the redevelopment processes would increase economic development as well as bring improvement for the island. One strong example is the case study of Beaumont, Texas. Therefore, Hurricane Ike was not only costly with regards to its damage on physical properties but also socially distressed for every side of the recovery processes.

6.4 Policy Implication

Beaumont and Galveston are two strong examples of the policy implication process. In Beaumont, the key of successfully redeveloping public housing after hurricane is the cooperation between each participant of recovery processes. Beaumont Housing Authority plays a crucial role in this collaboration. They reacted to the situation with adequate preparation as well as creative responses within their power. The damage of Beaumont did not get enough attention of federal agencies as it should because of the overwhelming attention drawn to New Orleans after Katrina. BHA was proactive in their responsibility in order to recall the support from federal agencies through many necessary actions by different groups. In addition, they took a wise move when collaborating with academic scholars and students from Department of Landscape Architecture and Urban Planning, Texas A&M University. This cooperation helped BHA effectively develop a comprehensive neighborhood revitalization plan to spur investment and redevelopment in public housing neighborhood. In addition, besides the innovation in financial solutions, BHA also developed an effective management mechanism that supported housing development. The public – private partnership also

prove the successful result in supporting residents by abundant service from daily needs to professional skills as well as necessary consultancies.

In contrast, Galveston faced many issues related to policy implementation. After suffering from devastated damage from Hurricane Ike, Galveston could have accomplished this opportunity to redevelop housing stock and improve the spill-over effects of these developments as part of the urban renewal process. However, the cooperation between Galveston Housing Authority and City government proved an unsuccessful relationship when GHA could not get the support from residents as well as public authority despite of their great efforts. GHA is an example of housing authority who acts as a bridge that connects residents, public authority, and developers. In this case, the delay of redevelopment public housing negatively affected every party of this triangle. Therefore, Galveston could well be considered an example of ineffective policy implementation in relationship with housing recovery in post-disaster.

6.5 Practical Recommendations

Recommendation #1: Housing Authority should be more proactive with substantial preparations and innovative solutions.

Recommendation #2: Housing for low income population needs to be developed in mixed-income community in order to support the individual as well as family improvement.

Recommendation #3: Public-private partnership should be executed in any steps of the development as long as it shares the same goal of supporting community.

Recommendation #4: Collaboration between housing authority and academic experts or professional firms should be accessed as an effective way to conduct successful development for new project.

6.6 Research Limitations

This research focuses on the issues of public housing after hurricane with the small amount of previous studies found in the same topic in literature. Therefore, limitations are the inevitable part of the study. All of the data used come from the secondary data such as Decennial census, American Community Survey, news from newspaper or television, city council meetings, and previous reports about the situation. On top of that, methods used might also reveal limitations of the study. There was no American Community Survey in 2005 when the Hurricane Rita swept through Beaumont. Therefore, the author could not conduct a similar ACS-based analysis for Beaumont as for Galveston. Since the hurricanes happen in 2005 and 2008, decennial census data 2000 and 2010 also show limitations in relating events to the change within communities. In a decade, too many events have happened in political, economic, social, or environmental aspects that may affect housing stock in both cities. In addition, the studies could not cover all of the aspects that may affect the issues of public housing after hurricanes. Therefore the conclusions might not comprehensively reflect the nature of events.

6.7 Additional Research Needed

From the limitation of this research, the author believes that future research should focus on several topics related to the political processes in these situations. In Galveston, the changing of city council reflects the complexity of political power that is voted by residents. To gather the voter's support, the new mayor promised to back away from rebuilding public housing and he made it. One of the first things he did in the role of a new mayor was to replace five in total of six councilmen by people who also agree not to rebuild public housing. The nature of voting district and its mechanism in each city could potentially become a necessary future research subject, in order to address the issue of housing in post-disaster.

REFERENCES

- AFP. 2007. *Housing Woes Take Bigger Toll on Economy than Expected: Paulson*.
Retrieved from:
<http://afp.google.com/article/ALeqM5hWSjWmGJ4YXTh3PM5kOC7csTT48g>
- Alba, R.D. and Logan, J.R. 1992. *Assimilation and Stratification in the Homeownership Patterns of Racial and Ethnic Groups*. *International Migration Review*, 26: 1314-1341.
- Atlas, J. and P. Dreier. 1992. *From 'Projects' to Communities: How to Redeem Public Housing*. *The American Prospect* 10: 74-85.
- Bacon, C. 1985. *Pruitt Igoe Revisited*. Occasional Working Paper Series, Department of Town and Regional Planning, Faculty of Architectural Studies, The University of Sheffield. TRP 61, September.
- Bates, F.L. (ed.). 1982. *Recovery, Change and Development: A Longitudinal Study of the Guatemalan Earthquake*. Athens, GA: Department of Sociology.
- Bates, F.L. and Peacock, W.G. 1987. *Disasters and Social Change*, in R.R. Dynes, B. Demarchi and C. Pelanda (eds.). *The Sociology of Disasters*' Milan, Italy: Franco Angeli Press.
- Bates, F.L. and Peacock, W.G. 1993. *Living Conditions, Disasters, and Developments: An Approach to Cross Cultural Comparisons*. Athens, GA: University of Georgia Press.
- Bauer, C. 1957. *The Dreary Deadlock of Public Housing*. *Architectural Forum* 106.
Retrieved from Stoloff, J. A. 2004. *A Brief History of Public Housing*. Paper presented at the annual meeting of the American Sociological Association, San Francisco, CA. Retrieved from: <http://www.allacademic.com>
- Bauman, J. F. 1987. *Public Housing, Race, and Renewal Urban Planning in Philadelphia, 1920-1974*. Philadelphia: Temple University Press.
- Bauman, J. F. 2000. *Jimmy Carter, Patricia Roberts Harris, and Housing Policy in the Age of Limits*. From Tenements to the Taylor Homes: In Search of an Urban Housing Policy in Twentieth-Century America. J. F. Bauman, R. Biles and K. M. Szylijan. University Park, Pennsylvania: The Pennsylvania State University Press: 246-264.

- Bauman, J. F. and Biles, Roger, ed. 2000. *From Tenements to the Taylor Homes: In Search of an Urban Housing Policy in Twentieth Century America*. Pennsylvania State University Press.
- Beaumont Housing Authority. 2005. *Annual Report 2005*. Retrieved from: <http://www.bmtha.org/about-us/publications>
- Beaumont Housing Authority. 2006. *Annual Report 2006*. Retrieved from: <http://www.bmtha.org/about-us/publications>
- Beaumont Housing Authority. *Public Housing Program*. 2012. Retrieved from: <http://authoritywww.bmtha.org/housing-services/public-housing-program>
- Berg, P. 2009. *Tropical Cyclone Report: Hurricane Ike, 1-14 September 2008*. National Hurricane Center.
- Berke, P., Beatley, T. and Feagin, C.. 1992. *Hurricane Gilbert Strikes Jamaica: Institutional Design Implication for Recovery and Development*. Hazard Reduction and Recovery Center, Texas A&M University. College Station, TX.
- Berke, P., Kartez, J., & Wenger, D. 1993. *Recovery After Disaster: Achieving Sustainable Development, Mitigation and Equity*. *Disasters*, 17(2), 93-109.
- Bolin, R. 1976. *Family Recovery from Natural Disaster: A Preliminary Model*. *Mass Emergencies*, 1: 267-77.
- Bolin, R. 1982. *Long-Term Family Recovery from Disaster*. Boulder, Co: Program on Environment and Behavior, Institute of Behavioral Science, University of Colorado, Monograph #36.
- Bolin, R. 1985. *Disasters and Long-Term Recovery Policy: A Focus on Housing and Families*. *Policy Studies Review*, 4: 709-15.
- Bolin, R. 1993a. *Household and Community Recovery after Earthquakes*. Boulder, Co: Program on Environment and Behavior, Institute of Behavioral Science, University of Colorado, Monograph #56.
- Bolin, R. 1993b. *Post-Earthquake Shelter and Housing: Research Findings and Policy Implications*. Pp. 107-131 in Monograph 5: *Socioeconomic Impacts*, K.J. Tierney and J.M. Nigg, eds. Monograph prepared for the 1993 National Earthquake Conference. Memphis, TN: Central U.S. Earthquake Consortium.
- Bolin, R. and Bolton, P. 1983. *Recovery in Nicaragua and the U.S.A*. *The International Journal of Mass Emergencies and Disasters (IJMED)*, 1:125-44.

- Bolin, R. and Stanford, L. 1991. *Shelter, Housing and Recovery: A Comparison of U.S. Disaster*. *Disasters*, 15: 24-34.
- Bolin, R. and Trainer, P. 1978. *Modes of Family Recovery Following Disaster: A Cross National Study*. in E. Quarantelli (ed), *Disaster: Theory and Research*. London: Sage.
- Bratt, R. 1986. *Public Housing: The Controversy and Contribution*. *Critical Perspectives on Housing*, 335-61.
- Bratt, R., Hartman, C. and Meyerson, A. 1986. *Critical Perspectives on Housing*. Philadelphia: Temple University Press.
- Comerio, M.C. 1998. *Disaster Hits Home: New Policy for Urban Housing Recovery*. Berkeley: University of California Press.
- Comerio, M.C., Landis, J.D., and Rofe, Y. 1994, *Post-Disaster Residential Rebuilding*. Working Paper 608. Berkeley, CA: University of California, Institute of Urban and Regional Development.
- Cunningham, Mary K., David J. Sylvester, and Margery A. Turner. 2000. *Section 8 Families in the Washington Region: Neighborhood Choices and Constraints. A Report to the Metropolitan Washington Council of Governments*. Washington, DC: Metropolitan Washington Council of Governments.
- Epp, Gayle. 1996. *Emerging Strategies for Revitalizing Public Housing Communities*. *Housing Policy Debate* 7(3): 563–88.
- Feagin, J.R. and Sikes, M.P. 1994. *Living with Racism: The Black Middle Class Experience*. Boston, MA: Beacon.
- Feins, J. D., S. R. Merrill, et al. 1994. *Revised Methods of Providing Federal Funds for Public Housing Agencies: Final Report*. US Department of Housing and Urban Development.
- FEMA. 2008. *Hurricane Ike Impact Report*. Retrieved from: http://www.fema.gov/pdf/hazard/hurricane/2008/ike/impact_report.pdf
- Fosburg, Linda, Susan J. Popkin, and Gretchen Locke. 1996. *An Historical and Baseline Assessment of HOPE VI, Volume 1*. Washington, DC: U.S. Department of Housing and Urban Development.
- Francaviglia, R.V. 1978. *Xenia Rebuilds: Effects of Predisaster Conditioning on Postdisaster Redevelopment*. *Journal of the American Planning Association*, 44, 1.

- Franck, K. and M. Mostoller. 1995. *From Courts to Open Space to Streets: Changes in the Site Design of US Public Housing*. Journal of Architectural and Planning Research 3(12): 186-220.
- Fullen, Bill. 2009. *Think Again on Island Housing*. Galveston County: The Daily News. Published June 10, 2009. Retrieved from: <http://galvestondailynews.com/story.lasso?wcd=139096>
- Galveston Housing Authority. 2011. *Rebuilding Plan for Public Housing*. Retrieved from: http://www.ghatx.org/pub_info_agencyplan.html
- Galveston Housing Authority. 2012. *GHA Admissions and Continued Occupancy Plan*. Retrieved from: http://www.ghatx.org/pub_info_agencyplan.html
- Griffiths, E., & Tita, G. 2009. *Homicide In and Around Public Housing: Is Public Housing a Hotbed, a Magnet, or a Generator of Violence for the Surrounding Community?*. Social Problems, 56(3), 474-493.
- Guy, R.F., Pol, L.G. and Ryker, R. 1982. *Discrimination in Mortgage Lending: The Mortgage Disclosure Act*. Population Research and Policy Review, 1: 283-296.
- Haas, E., R. Kates and M. Bowden. 1977. *Reconstruction Following Disaster*. MIT Press, Cambridge, MA.
- Haas, J.E., Kates, R.W. and Bowden, M.J. 1977. *Reconstruction Following Disaster*. Cambridge, MA. The MIT Press.
- Hays, R. A. 1995. *The Federal Government and Urban Housing: Ideology and Change in Public Policy*. State University of New York Press.
- Holin, M., Buron, L., Locke, G., and Cortes, A. 2003. *Interim Assessment of the HOPE VI Program Cross-Site Report*. Available at SSRN 1760002.
- Horton, H.D. 1992. *Race and Wealth: A Demographic Analysis of Black Homeownership*. Sociological Inquiry, 62: 480-489.
- Hurricane Rita. 2005. Retrieved from: http://en.wikipedia.org/wiki/Hurricane_Rita
- Jones, Leigh. 2009. *Officials, Experts Divided on Housing*. Galveston County: The Daily News. Retrieved from: <http://galvestondailynews.com/story.lasso?wcd=142127>
- Kerney-Odom, F. 2009a. *Galveston Housing Authority Overview*. Galveston Housing Authority. Retrieved from: <http://www.ghatx.org>
- Kerney-Odom, F. 2009b. *May 1, 2009 Board Meeting Press Release*. Galveston Housing Authority. Retrieved from: <http://www.ghatx.org>

- Knabb, R. D., Brown, D. P., & Rhome, J. R. 2006. *Tropical Cyclone Report, Hurricane Rita, 18-26 September 2005*. National Hurricane Center, Miami.
- Koten, D. 1980. *Community Organization and Rural Development: A Learning Process Approach*. Public Administration Review, September/ October.
- Kunreuther, H. and Roth, R.J. 1998. *Paying the Price: The Status and Role of Insurance Against Natural Disasters in the United States*. Washington, DC: Joseph Henry Press.
- Lake, R.W. 1980. *Racial Transition and Black Homeownership in American Suburbs*. In Sternlieb, G. and Hughes, J.W. (eds) *America's Housing* (pp. 419-438). Center for Urban Policy Research, New Brunswick, NJ.
- Landrum, A. 2006. *Hope VI Community & Supportive Services Best Practice – Innovative Partnerships Beaumont Housing Authority*. Retrieved from: <http://portal.hud.gov/hudportal/documents/huddoc?id=beaumont.pdf>
- Lenz, Thomas J., and James Coles. 1999. *Providing Rental Housing in the Chicago Region: Challenges and Issues*. Chicago: The Great Cities Institute, University of Illinois at Chicago.
- Ligon, Dan. 2009. *A Chance to Build a Better Island*. Galveston County: The Daily News. Retrieved from: <http://galvestondailynews.com/story.lasso?wcd=138730>
- Logan, J.R. and Molotch, H.L. 1987. *Urban Fortunes: The Political Economy of Place*. Berkeley, CA: University of California Press.
- Lone Star Legal Aid. 2009. *HUD Launches Campaign for Ike and Gustav Family Assistance*. Retrieved from: <http://lonestarlegalaid.blogspot.com>
- Lone Star Legal Aid. 2009. *LSLA & Galveston Housing Authority Agree on Hurricane Ike Public Housing Plans*. Retrieved from: <http://lonestarlegalaid.blogspot.com/2009/03/lsla-galveston-housing-authority-agree.html>
- Mabasa, Arthur. 2009. *Let's Get Housing Right This Time*. Galveston County: The Daily News. Retrieved from: <http://galvestondailynews.com/story.lasso?wcd=143391>
- Mader, G. 1980. *Land Use Planning After Earthquakes*. William Spangle and Associate, Portola Valley, CA.
- Marcuse, P. 1986a. *The Beginnings of Public Housing in New York*. Journal of Urban History 12(4): 353-390.

- Marcuse, P. 1986b, 1978. *Housing Policy and the Myth of the Benevolent State (and Afterward)*. Critical Perspectives on Housing. R. G. Bratt, C. Hartman and A. Meyerson. Philadelphia: Temple University Press: 248-263.
- Marcuse, P. 1995. *Interpreting 'Public Housing' History*. Journal of Architectural and Planning Research 1(3): 240-258.
- Massey, Douglas S. and Nancy A. Denton. 1993. *American Apartheid: Segregation and the Making of the Underclass*. Cambridge, MA: Harvard University Press.
- NAS-Advisory Committee on the International Decade of Natural Hazard Reduction. 1987. *Confronting Natural Disasters*. Washington D.C.: National Academy Press.
- National Housing Agency - Federal Public Housing Authority. 1946. *Public Housing Design: A Review of Experience in Low-Rent Housing*. Washington DC: Government Printing Office.
- Newman, Oscar and Karen Franck. 1980. *Factor Influencing Crime and Instability in Urban Housing Developments*. Washington, DC: U.S. Department of Justice, National Institute of Justice.
- Newman, Oscar. 1972. *Defensible Space: Crime Prevention through Urban Design*. New York: Macmillan.
- NOAA (National Oceanic and Atmospheric Administration). 2005. *Hurricane Rita Report*. Retrieved from: <http://www.ncdc.noaa.gov/special-reports/rita.html>
- NOAA (National Oceanic and Atmospheric Administration). 2008. *Climate of 2008 Annual Review*. Retrieved from: <http://www.ncdc.noaa.gov/oa/climate/research/2008/ann/events.html>
- Oliver, M.L. and Shapiro, T.M. 1995. *Black Wealth / White Wealth: A New Perspective on Racial Inequality*. New York: Routledge.
- Orlebeke, C. J. 2000. *The Evolution of Low-Income Housing Policy, 1949 to 1999*. Housing Policy Debate 11(2): 489-520.
- Peacock W.G., Killian, C. D., and Bates, F.L. 1987. *The Effects of Disaster Damage and Housing Aid on Household Recovery Following the 1976 Guatemalan Earthquake*. International Journal of Mass Emergencies and Disasters, 5: 63-88.
- Peacock, W. G., Dash, N., & Zhang, Y. 2007. *Sheltering and Housing Recovery Following Disaster*. Handbook of Disaster Research, 258-274.

- Peacock, W. G., Zhang, Y. and Dash, N. 2005. *Single Family Housing Recovery after Hurricane Andrew in Miami-Dade County*. College Station, TX: Hazard Reduction & Recovery Center, Texas A&M University.
- Peacock, W.G. and Ragsdale, A.K. 1997. *Social Systems, Ecological Networks and Disasters: Toward a Socio-political Ecology of Disasters*. Pp 20-35 in W.G. Peacock, B.H. Morrow, and H. Gladwin, Hurricane Andrew: Ethnicity, Gender, and the Sociology of Disasters. London: Rutledge.
- Phillips, B.D. 1996. *Creating, Sustaining and Losing Place: Homelessness in the Context of Disaster*. *Humanity & Society*, 20: 94-101.
- Popkin, S. J., Bruce Katz, Mary K. Cunningham, Karen D. Brown, Jeremy Gustafson, and Margery A. Turner. 2004. *A Decade of HOPE VI: Research Findings and Policy Challenges*. Retrieved from: http://www.urban.org/UploadedPDF/411002_HOPEVI.pdf
- Popkin, Susan J., and Mary K. Cunningham. 1999. *CHAC Inc. Section 8 Program: Barriers to Successful Leasing Up*. Washington, DC: The Urban Institute.
- Quarantelli, E. L. and Dynes, R. 1989. *Reconstruction in the Context of Recovery: Thoughts on the Alaskan Earthquake*. Paper presented at the Conference on Reconstruction after Urban Earthquakes, National Center for Earthquake Engineering Research. Buffalo, NY.
- Quarantelli, E.L.1982. *General and Particular Observations on Sheltering and Housing in American Disasters*. *Disasters*, 6: 277-81.
- Quarantelli, E.L.1995. *Patterns of Shelter and Housing in US Disasters*. *Disaster Prevention and Management*, 4: 43-53.
- Rice, H. 2009. *Six Month after Ike, Thousands Unable to Return Home*. Retrieved from: <http://www.chron.com/news/houston-texas/article/Six-months-after-Ike-thousands-unable-to-return-1750547.php>
- Rice, H. 2012. *States Gives Galveston Deadline on Public Housing*. Retrieved from: <http://www.chron.com/news/houston-texas/article/State-land-office-give-Galveston-deadline-on-3802180.php>
- Riis, J. A. 1890. *How the Other Half Lives: Studies among the Tenements of New York*. New York: Scribner's Sons.
- Rubin, C., M. Saperstein and D. Barbee. 1985. *Community Recovery from a Major Disaster*. Monograph 41. Institute of Behavioral Science, University of Colorado, Boulder, CO.

- Sagalyn, L.B. 1983. *Mortgage Lending in Older Urban Neighborhoods: Lessons from Past Experiences*. *Annals of American Academy*, 465: 98-108.
- Salama, Jerry J. 1999. *The Redevelopment of Distressed Public Housing: Early Results from HOPE VI Projects in Atlanta, Chicago, and San Antonio*. *Housing Policy Update* 10(1): 95–142.
- Schill, M. H. 1993. *Distressed Public Housing: Where Do We Go from Here?*. *The University of Chicago Law Review*, 60(2). 497-554. Retrieved from: <http://www.jstor.org/stable/pdfplus/1600078.pdf?acceptTC=true>
- Schwartz, Alex F. 2010. *Housing Policy in the United States*. Second Edition. Routledge, New York
- South, S.J. and Crowder, K.D. 1997. *Escaping Distressed Neighborhoods: Individual, Community and Metropolitan Influences*. *American Journal of Sociology*, 102: 1040-1084.
- Spain, D. 1996. *Public Housing and the Beguinage*. *Gender in Urban Research* 42: 256-270.
- Stegman, M. 1990. *The Role of Public Housing in a Revitalized National Housing Policy*. *Building Foundations: Housing and Federal Policy*. D. DiPasquale and L. C. Keyes. Philadelphia: University of Pennsylvania Press: 333-364.
- Stinchcombe, A.L. 1965. *Social Structure and Organizations*. In J. March (ed.) *The Handbook of Organizations*. 142-193. New York: Rand McNally.
- Stoloff, J. A. 2004. *A Brief History of Public Housing*. Paper presented at the annual meeting of the American Sociological Association, San Francisco, CA. Retrieved from: <http://www.allacademic.com>
- Suchman, Diane R. 1996. *Transformation of Public Housing Developments into Mixed-Income Communities*. Urban Land Institute Working Paper Series 656. Washington, DC: Urban Land Institute.
- Taylor, Heber. 2009. *Public Housing's Wrong Direction*. *The Galveston County Daily News*. Retrieved from: <http://galvestondailynews.com/story.lasso?wcd=142448>
- Teaford, J. C. 2000. *Urban Renewal and Its Aftermath*. *Housing Policy Debate* 11(2): 443-465. Temple University Press: 335-361.
- Turbov, M., and Piper, V. 2004. *HOPE VI as a Catalyst for Neighborhood Change*. Washington, DC: Brookings Institution.

United States Housing Act of 1937. 50 (Part 1). *University of Chicago Law Review* 60: 497-554.

Van Zandt, Shannon, Edward Tarlton, June Martin, Dawn Jourdan, and Cecilia Giusti. 2012. *Magnolia Garden HOPE VI Evaluation*. College Station, TX: Center of Housing and Urban Development, Texas A&M University.

Von Hoffman, A. 2012. *History Lessons for Today's Housing Policy The Political Processes of Making Low-Income Housing Policy*. *Housing Policy Debate*, 22(3), 321-376.

White, S. 2010. *Redevelopment Opportunities from Involuntary Demolition, Galveston Public Housing Post Hurricane Ike*. Master Paper, Texas A&M University.

Wild, A.C. 2009. *Hurricane Ike: Rehabilitation of Affordable Rental Unit on Galveston Island Final Report*. Independent Study: Community and Regional Planning 396. The University of Texas at Austin.

Wilson, William Julius. 1987. *The Truly Disadvantaged: The Inner City, The Underclass, and Public Policy*. Chicago: The University of Chicago Press.

Wisner, B, 1998. *Marginality and Vulnerability: Why The Homeless of Tokyo Don't 'Count' in Disaster Preparations*. *Applied Geography*, 18: 25-53.

Wu, J-Y. and Lindell, M. K. 2004. *Housing Recovery after Two Major Earthquakes: The 1994 Northridge Earthquake in The United States and The 1999 Chi-Chi Earthquake in Taiwan*. *Disasters*. 28: 63-81.

APPENDIX A

Table A1. Key legislation shaping public housing in the United States since 1937

Legislation and year	Action initiated
Housing Act of 1949	<p>Declared that every American deserves a “decent home and suitable living environment” through urban redevelopment. The act included:</p> <ul style="list-style-type: none"> - financing for slum clearance (Title I); - increasing FHA mortgage insurance for home buyers (Title II); and - committing federal funds to develop 810,000 new public housing units, primarily on land where slum clearance had taken place, to replace lost units (Title III)
Housing Act of 1954	<p>Introduced urban renewal, which focused on conservation rather than clearance through a “workable program” of rehabilitating and upgrading urban “slum and blight” areas. The act aimed to increase private sector contributions, responsibility of local government, and citizen participation and to use fewer federal dollars to produce more results.</p>
Housing and Community Development Act of 1974	<p>Sought to develop viable urban communities by providing decent housing, suitable living environment, and expanding economic opportunities principally for low- and moderate-income families. Replaced categorical grants with Community Development Block Grant (CDBG) and introduced Section 8 rent supplement for new, existing, and rehabbed rental housing plus funding for development of affordable housing by private sector.</p>
Tax Reform Act of 1986	<p>Eliminate some tax provisions that favored low-income rental housing production and instituted a tax credit system authorizing states to give “tax credit” to property owners to offset taxes on income. Tax credits are generally sold to outside investors, usually syndicated, to raise initial development funds for a project. Projects must have at least 20 percent of units for households at or below 50 percent of median or 40 percent of units for households at or below 60 percent of area median income. Rents are not to exceed 30 percent of income at these thresholds.</p>
Cranston-Gonzales National Affordable Housing Act of 1990	<p>Focused attention on the availability of affordable housing for low- and moderate-income families, and created the HOME program, which provided new resources for nonprofit and public agencies to develop affordable rental and for-sale housing.</p>

Source: Larry Bennett, Janet L. Smith, and Patricia A. Wright. 2006. Where Are Poor People Live? Transforming Public Housing Communities.

Table A2. Basic statistical data for Beaumont and Galveston, Texas

People QuickFacts	Beaumont	Galveston
Population, 2011 estimate	118,548	48,444
Population, 2010 (April 1) estimates base	118,296	47,743
Population, percent change, April 1, 2010 to July 1, 2011	0.2%	1.5%
Population, 2010	118,296	47,743
Persons under 5 years, percent, 2010	7.3%	5.9%
Persons under 18 years, percent, 2010	24.7%	19.3%
Persons 65 years and over, percent, 2010	12.2%	13.6%
Female persons, percent, 2010	51.3%	48.9%
Not Hispanic or Latino White	34.7%	45%
Not Hispanic or Latino Black	46.9%	18.6%
Not Hispanic or Latino Other	5%	5.1%
Hispanic or Latino	13.4%	31.3%
Housing units, 2010	50,689	32,368
Homeownership rate, 2007-2011	57.6%	48.6%
Housing units in multi-unit structures, percent, 2007-2011	26.4%	40.5%
Median value of owner-occupied housing units, 2007-2011	\$97,300	\$128,300
Households, 2007-2011	45,073	21,111
Persons per household, 2007-2011	2.5	2.2
Per capita money income in the past 12 months (2011 dollars), 2007-2011	\$23,674	\$25,526
Median household income, 2007-2011	\$40,283	\$37,368
Persons below poverty level, percent, 2007-2011	21.6%	22.6%
Business QuickFacts		
Total number of firms, 2007	9,943	4,071
Black-owned firms, percent, 2007	23.8%	S
American Indian- and Alaska Native-owned firms, percent, 2007	0.4%	F
Asian-owned firms, percent, 2007	6.0%	S
Native Hawaiian and Other Pacific Islander-owned firms, percent, 2007	S	F
Hispanic-owned firms, percent, 2007	5.3%	S
Women-owned firms, percent, 2007	26.8%	31.2%
(a) Includes persons reporting only one race / S: Suppressed; does not meet publication standards		
(b) Hispanics may be of any race, so also are included in applicable race categories		
F: Fewer than 100 firms / Z: Value greater than zero but less than half unit of measure shown		

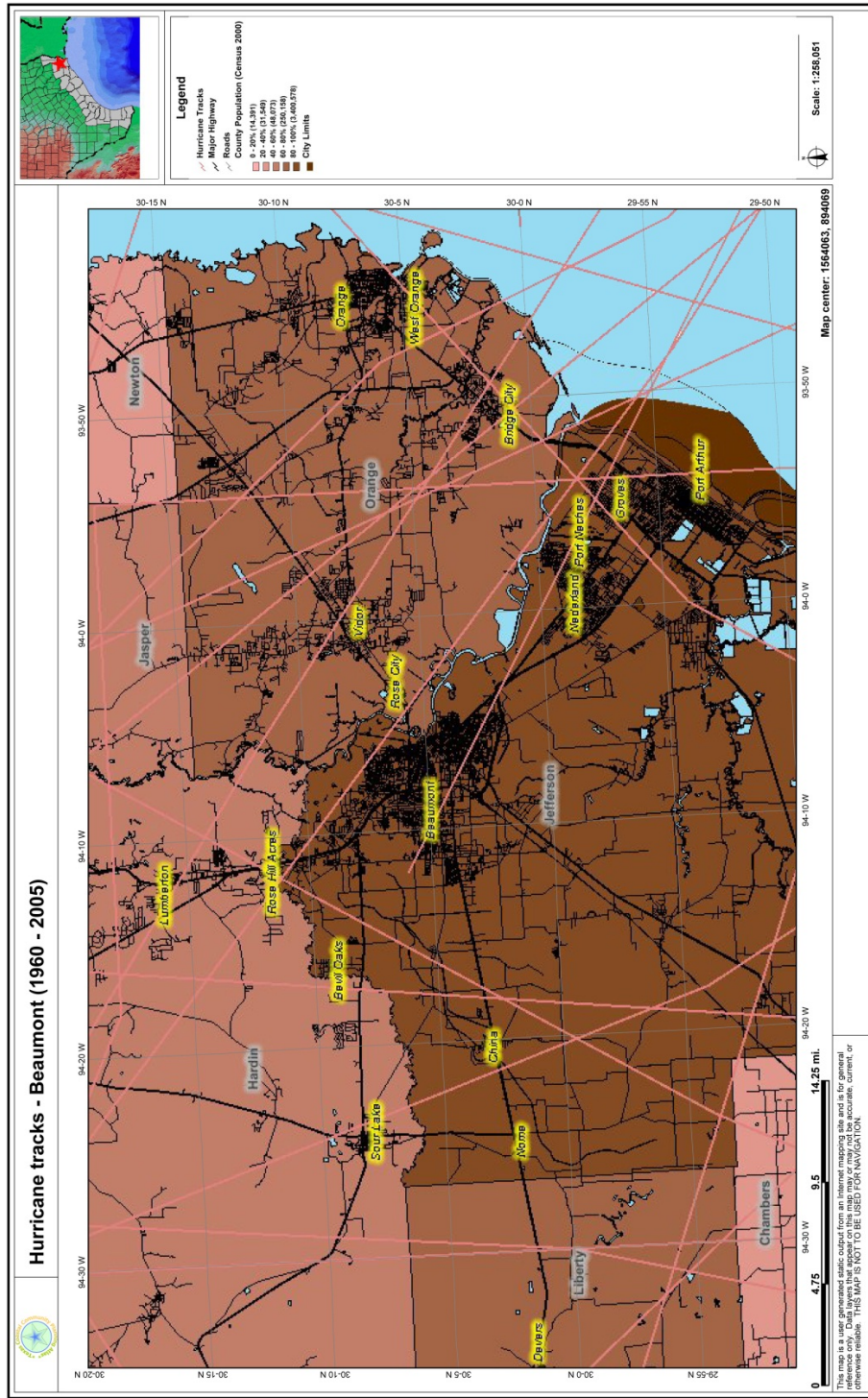
Source: US Census Bureau State & County QuickFacts

Table A3. Public Housing Development in Beaumont, TX

No	Name	Address	Amenity	Client Services	Resident Activities	Number of Units	Total
1	Tracewood I	4075 Arthur, Beaumont, TX 77706	✓	✓	✓	0 0 24 0 0	24
2	Tracewood II	4935 Concord, Beaumont, TX 77708	✓	✓	✓	0 5 41 5 2	53
3	The Crossing	3705 E. Lucas, Beaumont, TX 77708	✓	✓	✓		N/A
4	Northridge Manor	4155 Maida, Beaumont, TX 77708	✓	✓	✓	0 10 70 60 10	150
5	Regent I Apartment	1715 Regent St., Beaumont, Texas 77703	✓	✓	✓	0 22 94 44 0	160
6	Point North	3710 Magnolia St., Beaumont, Texas 77703	✓	✓	✓	0 24 84 60 0	168
7	Grand Pine Court	2935 Texas Ave., Beaumont, Texas 77703	✓	✓	✓	30 58 6 0 0	94
8	Concord Homes	2020 Cottonwood, Beaumont, Texas 77703	✓	✓	✓	0 6 42 40 12	100
			Air conditioning	Childcare	Girl Scouts	0 bedroom	
			Laundry facilities	Security service	Power Castle	1 bedroom	
			Community room	Transportation	Spinning Into Action	2 bedrooms	
				GED Training	Core Homeownership Classes	3 bedrooms	
				Resume Writing	Basic Computer Instruction Class	4 bedrooms	
				Job Training	BBQ and Picnic Table		
				Nutrition classes	Recreational center		
				Health Fairs			
				Senior and Disabled Supportive			

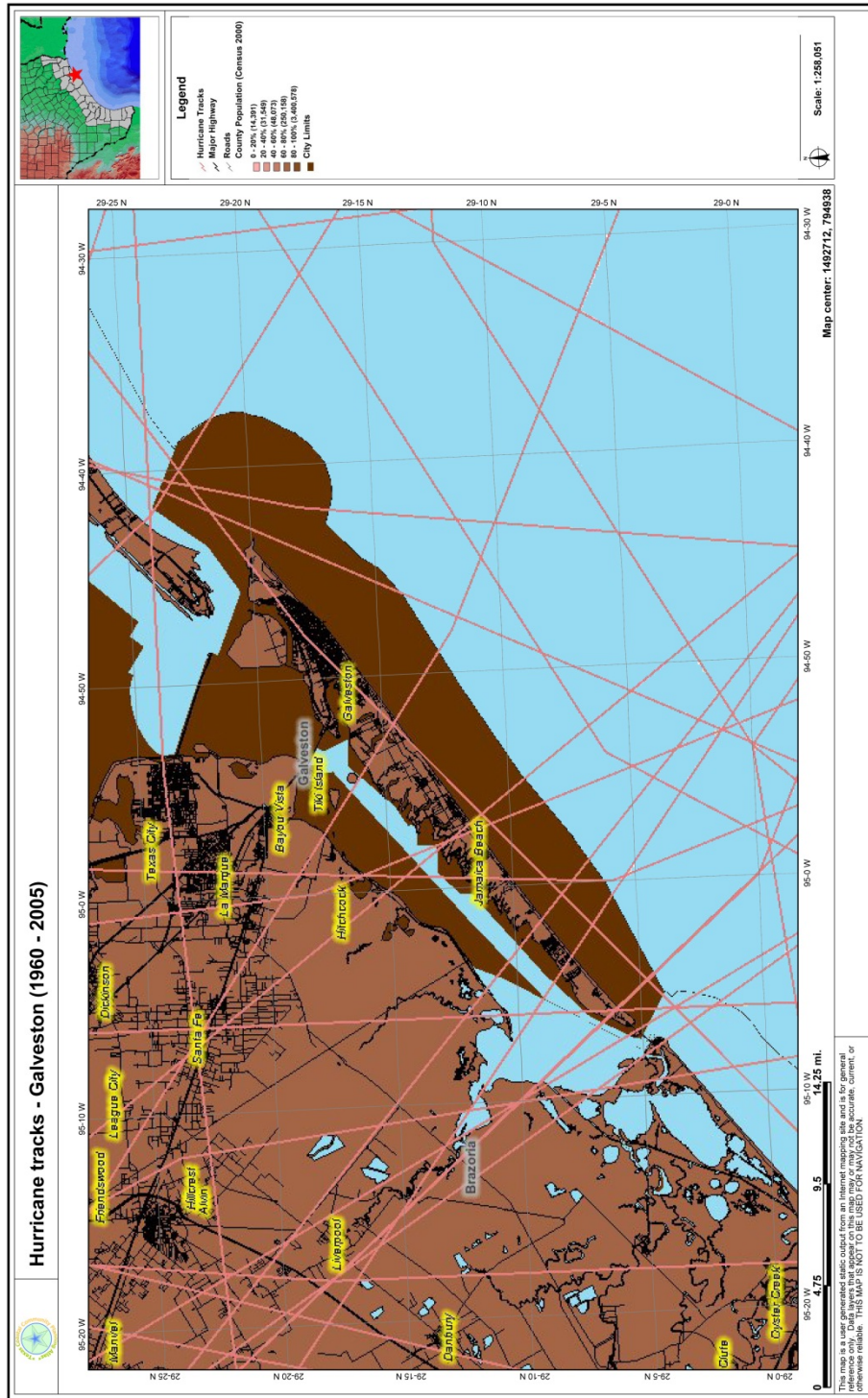
Source: Beaumont Housing Authority (BHA)

Exhibit A1. Hurricane tracks, Beaumont (1960-2005)



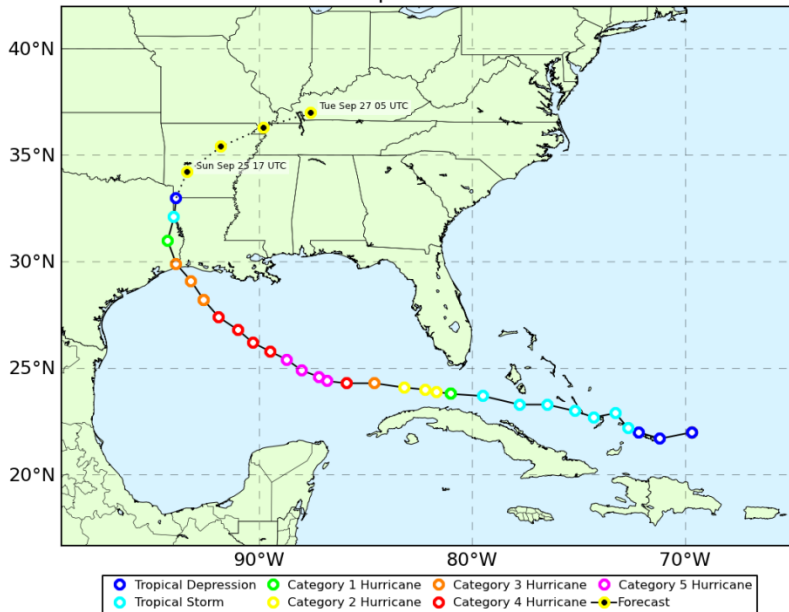
Source: Texas Sustainable Coastal Initiative (<http://coastalatlantas.tamug.edu>)

Exhibit A2. Hurricane tracks, Galveston (1960-2005)



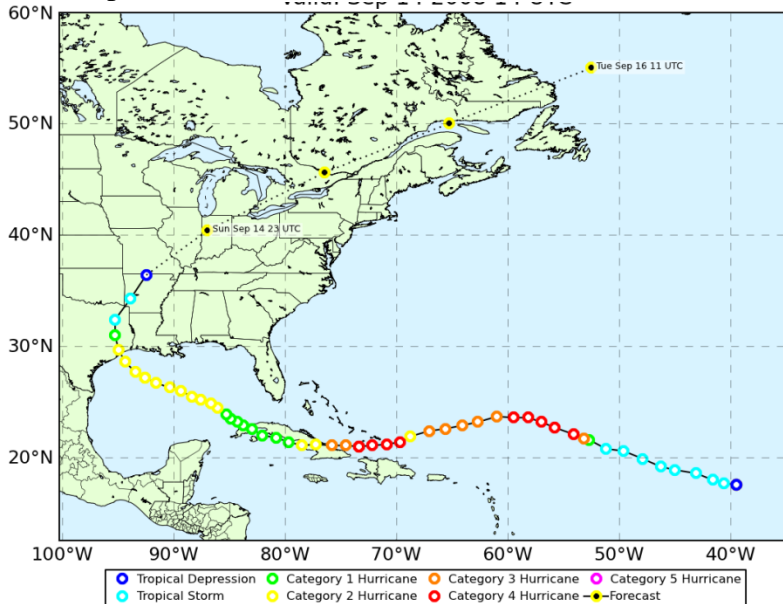
Source: Texas Sustainable Coastal Initiative (<http://coastalatlantas.tamug.edu>)

Exhibit A3. Hurricane Rita: Forecast track for NHC Advisory 30 – (Valid Sep 25 2005 08 UTC)



Source: National Hurricane Center (NHC)

Exhibit A4. Hurricane Ike: Forecast track for NHC Advisory 30 (Valid Sep 14 2008 14 UTC)



Source: National Hurricane Center (NHC)

Exhibit A5. Public Housing Developments in Beaumont, Texas.

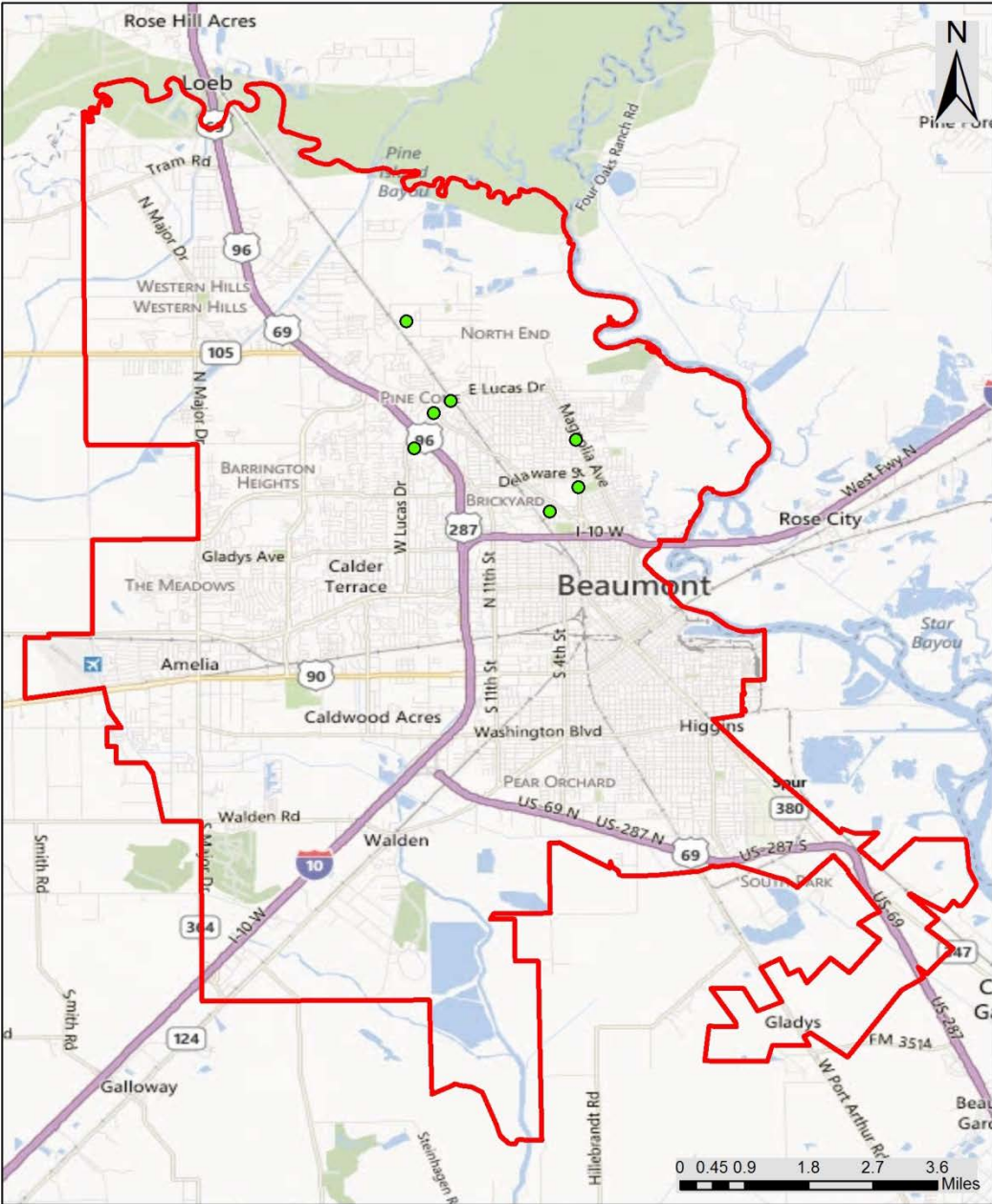


Exhibit A6. Public Housing Developments in Galveston, Texas.

