Repetitive Loss Area Analysis #10
Guadalupe County, Texas
Lake Placid Area

July 31, 2009
University of New Orleans
Center for Hazards Assessment, Response and Technology

www.floodhelp.uno.edu

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Key Terms and Acronyms

100-year Flood: it is the flood elevation that has a one percent chance of being equaled or exceeded each year.

AACOG: Alamo Area Council of Governments

Area Analysis: An approach to identify repeatedly flooded areas, evaluate mitigation approaches, and determine the most appropriate alternatives to reduce future repeated flood losses.

BFE: Base Flood Elevation: The elevation of the crest of the base flood or 100-year flood.

UNO-CHART: Center for Hazards Assessment, Response and Technology at the University of New Orleans

cfs: Cubic feet per second, the means by which the flow of water is measured

CRS: Community Rating System, voluntary incentive program that recognizes and encourages community floodplain activities that exceed the minimum National Flood Insurance Program (NFIP) requirements

ETJ: Extraterritorial Jurisdiction

FEMA: Federal Emergency Management Agency

FIRM: Flood Insurance Rate Map

Floodway: The channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent annual chance flood can be carried without substantial increases in flood heights.

Freeboard: A factor of safety usually expressed in feet above a flood level for purposes of floodplain management.

GIS: Geographic Information Systems

Hazard Mitigation: Any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.

ICC: Increased Cost of Compliance, a $30,000 rider on flood insurance policies for policy holders located in the special flood hazard area that can be used to bring the structure into compliance in the event that it is substantially damaged by a flood.

msl: Mean sea level

NFIP: National Flood Insurance Program

NWS: National Weather Service

Repetitive Flood Loss (RL): An NFIP-insured property where two or more claim payments of more than $1,000 have been paid within a 10-year period since 1978.

SFHA: Special Flood Hazard Area

Severe Repetitive Flood Loss Properties (SRL): As defined by the Flood Insurance Reform Act of 2004, 1-4 family residences that have had four or more claims of more than $5,000 or two claims that cumulatively exceed the reported building’s value. The Act creates new funding mechanisms to help mitigate flood damage for these properties.

Substantial Improvement: The repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure either, (1) before the improvement or repair is started, or (2) if the structure has been damaged and is being restored, before the damage occurred

USGS: United States Geological Survey
Acknowledgements:

The compilation of this report was managed by Sarah Markway Stack, MPA, CFM, a CHART Research Associate; and Erin Patton, a CHART Graduate Research Assistant and Masters Candidate in Sociology. Special appreciate is extended to Mr. Larry Timmermann, Mr. Jimmy Harless, and Ms. Shelly Coleman of the Guadalupe Office of Environmental Health; and Mr. Manuel Razo of the Texas Water Development Board.
Flooding is a problem far too familiar to many neighborhoods across the United States. Enduring the consequences of flooding over and over again can be quite frustrating. When the water rises, life is disrupted, belongings are ruined, and hard-earned money is spent.

This report has been created in collaboration with Guadalupe County officials, and the owners of homes in a repetitively flooded area who have continually suffered the personal losses and stresses associated with living in a flood-prone house. The goal is to help homeowners reduce their flood risk by providing a broader understanding of the flooding problems in their neighborhood, and the potential solutions to the continual suffering that results from repetitive flooding. The availability of possible funding sources for certain mitigation options is also discussed.

Here, flooding issues and potential mitigation measures are discussed for homes located in the Lake Placid Area of Guadalupe County, TX. Not all mitigation measures are appropriate for all homes in the study area, given the varying flooding conditions within the study area, however, the homes in this study are representative of other homes throughout the region.

It is understood that there are many stresses associated with repetitive flooding including worry about how high the water may rise, the loss of personal belongings, the possibility of mold, and whether or not neighbors will return after the next event. Adding to this worry is the uncertainty related to the potential solutions. Should I elevate and if so, how high? Should I pursue a buyout offer from the County? How much will a mitigation project cost? What will my neighborhood look like if I am the only one to mitigate, or the only one not to mitigate? Is there a solution that might work for the entire neighborhood? These questions are common, and this report attempts to answer them according to the specific situation faced by homeowners in the Lake Placid Area. Informed homeowners can become even stronger advocates for policy change at the neighborhood, city, county, state and even federal levels. Overall, it is hoped that by gaining a better understanding of the flooding issues, neighborhoods can become safer and homeowners better able to confront the hazard of flooding.

**Background**

The National Flood Insurance Program (NFIP) is continually faced with the task of paying claims while trying to keep the price of flood insurance at an affordable level. It has a particular problem with repetitive flood loss properties\(^1\), which are estimated to cost $200 million per year in flood insurance claim payments. Repetitive flood loss properties represent only 1 percent of all flood insurance policies, yet historically they have accounted for nearly one-third of the claim payments (over $4.5 billion to date). Mitigation of these repetitive flood loss properties will reduce the overall costs to the NFIP as well as to the communities in which they are located and to individual

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\(^1\) A repetitive loss property is one that has flooded at least two times in any 10-year time period since 1978, and each claim was over $1000.
homeowners. Ultimately, mitigating repetitive flood loss properties benefits all tax
payers.

The University of New Orleans’ Center for Hazards Assessment, Response and
Technology (UNO-CHART) received a special grant from FEMA to collate data and
analyze the repetitive flood loss areas in Louisiana and Texas. Using a geographic
information system (GIS) and flood insurance claims data, repetitive flood loss areas and
properties are being prioritized for attention and analysis. In selected locations where
repetitive flooding is a problem, UNO-CHART works with local officials and residents to
conduct in-depth analyses of the causes and possible solutions to the flooding problem.

UNO-CHART conducted an “area analysis” case study in the Lake Placid Area. An area
analysis follows FEMA guidelines to determine why an area has repeated flood losses
and what alternative flood protection measures would help break the cycle of repetitive
flooding.

The Area: The Guadalupe River Basin is considered one of the three most dangerous
regions in the United States for flash flooding. Texas Hill Country is often referred to as
“Flash Flood Alley” due to the heavy rainfall and numerous creeks and streams that can
contribute to drastic flooding in a matter of hours. The study area is located along both
shores of a portion of the Guadalupe River known as Lake Placid, just north of the Lake
Placid Dam (TP-4) in the basin of the Guadalupe River. Figure 1 on the following page
shows the study area for this area analysis. There is a high concentration of repetitive
flood loss properties in this area, which falls in both high risk and low risk flood zones.
The Lake Placid Area lies in unincorporated Guadalupe County, and is in the
Extraterritorial Jurisdiction (ETJ) of the City of Seguin. According to the ETJ Interlocal
Agreement, the County has the authority to enforce floodplain regulations and assumes
responsibility for drainage system maintenance within platted subdivisions in the ETJ, as
are found in the Lake Placid analysis area. The City has the authority to enforce
subdivision ordinances as found in the City’s Code of Ordinances.

Process: Generally, this area analysis follows a FEMA-prescribed five step process.
However, the UNO-CHART Team has enhanced the five-step process by adding two
important steps: a detailed area selection step and an ongoing collaborative relationship
with the neighborhood. During the area selection process information about the area is
reviewed including the repetitive flood loss claims data as well as other relevant
information about the neighborhood such as the flooding history, and the interest of the
residents in learning more about flood mitigation. This is done as a joint effort with
UNO-CHART team members, local officials, and residents. The ongoing collaborative
relationship is offered to the selected community. UNO-CHART will continually be
available to provide homeowners with information concerning mitigation measures,
policy issues, or other flooding related matters as requested; and a ‘follow-up’ with the
community will be conducted after a period of time has passed.
Detailed Area Selection Process: The area to be studied was selected through a review of the repetitive flood loss claims data as well as other relevant information about residents of the area such as their interest in flood mitigation. This was done through a collaborative effort with FEMA Region VI – Mitigation Division, the Texas Water Development Board, local officials, and residents.
Step 1: Advise all the property owners in the repetitive flood loss area that the analysis will be conducted.

Step 2: Collect data on the analysis area and each building in the identified study area within the neighborhood to determine the cause(s) of the repetitive damage.

Step 3: Review alternative mitigation approaches and determine whether any property protection measures or drainage improvements are feasible.

Step 4: Contact agencies or organizations that may have plans that could affect the cause or impacts of the flooding.

Step 5: Document the findings, including information gathered from agencies and organizations, and relevant maps of the analysis area.

Ongoing Collaboration with the Neighborhood: UNO-CHART establishes an ongoing collaborative partnership with the study area community. The UNO-CHART role includes providing homeowners with information concerning mitigation measures, policy issues, or other flooding related matters as requested. UNO-CHART will also conduct a ‘follow-up’ with the community after a period of time has passed.

Detailed Area Selection Process

In February of 2009, after a careful review of the locations of repetitive flood loss properties throughout the State of Texas, a team from UNO-CHART visited Guadalupe County and met with several local officials from the Offices of Environmental Health and Emergency Management, and the Commissioners’ Court. The County recently joined the Community Rating System (CRS) indicating an interest in flood safety, and offered assistance in obtaining appropriate geographic information system (GIS) layers and necessary documents for the completion of this report. The team also visited the potential area for analysis and spoke to several residents, gauging their interest and willingness to share information about previous flooding experiences. A neighborhood organization, Citizens United for Lake Placid, was identified as a group advocating for water safety, including flood safety. It was determined at this time that because of the commitment of local officials and neighborhood residents to floodplain management, and the number of repetitive flood loss properties, the Lake Placid area would be a good site for an area analysis.

2 More information about the CRS can be found on page 24 of this report.
Step 1: Advise the Homeowners

The first step of the FEMA five-step process is to advise the neighborhood about the project. In May 2009 Guadalupe County sent a notice to the homeowners introducing them to the project, and informing them that researchers from UNO-CHART would be collecting data about their neighborhood. The letter included a data sheet to be completed by the homeowners. Copies of the letter and data sheet can be found in Appendices A and B in this report.

Step 2: Data Collection

The second step in the process was the collection of relevant data on the problem (i.e., the properties exposed to the flooding and cause(s) of the repetitive damage). Much of the data was collected through the collaboration with many of Guadalupe County’s local agencies and departments including the office of Environmental Health, and the Office of Emergency management, and the Guadalupe Blanco River Authority (GBRA). For a complete list of these stakeholders, see Step 4 of this report. There were 5 primary sources of data and information:

   I. Community Information
   II. Flood Insurance and Flood Event Data
   III. Dam Information
   IV. Flooding Experiences of Homeowners
   V. On-Site Data Collection

I. Community Information

The UNO-CHART team reviewed the following plans for information related to flooding in the Lake Placid Area:

   A. The Seguin Comprehensive Master Plan³
   B. Guadalupe County Floodplain Order, November 2, 2007⁴
   C. Alamo Area Council of Governments (AACOG) Hazard Mitigation Plan⁵

A. The Seguin Comprehensive Master Plan: The City of Seguin completed a city-wide Master Plan in October of 2008. The plan briefly addresses the impacts of flooding. According to the plan, flooding in Seguin is a natural phenomenon caused by prolonged rain events, storms, and hurricanes. It also lists increased development in the surrounding areas as a contributor to flooding. The plan states that development leads to an increase

³ The Seguin Comprehensive Master Plan can be found at the city’s website: http://www.ci.seguin.tx.us/
⁴ The floodplain Order can be obtained from the Office of Environmental Health
⁵ The AACOG Hazard Mitigation Plan can be found at: http://www.aacog.com/homelandsecurity/PDFFiles/AACOG%20Regional%20Mitigation%20Action%20Plan%20121405.pdf
in impervious surfaces that increases stormwater runoff and dam failures at McQueeney, Lake Placid, and Canyon Dams as additional flood hazards.

Recommendations given in the plan for addressing flooding in Seguin include:

- Creating land use regulations that acknowledge the flood prone nature of life in the Guadalupe River Basin;
- Improving stormwater management policy and procedures;
- Incorporating principles of retention, detention, and infiltration into plans as to enhance the conveyance of surface water; and
- Designing areas of catchment and infiltration so as to decrease the impact of ever increasing impervious surfaces due to development and relieve some of the stress placed on the Guadalupe River to accommodate the increased runoff.

The plan notes that the current high water levels have been set without taking into account future developments within the watershed. It is suggested that any future development in the Lake Placid Area be undertaken with consideration to future development along the Guadalupe River floodplain. By doing so, the end goal is to reduce flooding due to watershed development in accordance with City policy.

Although the City has not conducted a drainage system analysis as of yet, it does enforce ordinances that mandate that all new development detain post-development runoff to pre-development runoff rates for 2, 5, 25, 50, and 100 year storm events. This requirement must be met by any and all development within the City’s ETJ, including the Lake Placid Area.

Little Mill Creek runs along the west side of Seguin just outside the City limits. There have not been any improvements to Little Mill Creek. Many areas along Little Mill Creek are prone to flooding from large rain events; because Little Mill Creek’s watershed is outside the ETJ of Seguin, the City cannot enforce detention requirements or preventative measures to help reduce the impact from flooding. Guadalupe County would be responsible for implementing and enforcing any detention requirements or preventative measures for Little Mill Creek.

**B. The Guadalupe County Floodplain Order, November 2, 2007:** In order to reduce flood losses, the Guadalupe County Floodplain Order uses the following methods:

- Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities.
- Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction.
- Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood water.
• Control filling, grading, dredging and other development which may increase flood damage.
• Prevent or regulate construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands.

In the high risk AE flood zone, the Special Flood Hazard Area (SFHA), certain requirements exist for new and substantially improved (the value of the building increased by at least 50% due to the renovation) buildings. These requirements include:
• anchoring systems that prevent floatation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy
• Construction methods and practices that minimize flood damage and require that the first floor of living space is elevated one foot above the level of the 1% annual chance flood
• Construction materials that are resistant to flood damage
• Locating or designing electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities so that flood water is prevented from entering or accumulating in the components.

In the SFHA, any enclosed space located below the lowest floor of living space must be used for parking of vehicles, building access or storage. The enclosed space must include flood vents that allow for the entry and exit of floodwaters through at least two openings on separate walls having a total net area of not less than 1 square inch for every square foot of the enclosed area. The bottom of all openings shall be no higher than one foot above the ground, and the openings may have screens, louvers, valves, or some other covering so long as flood waters can freely flow into and out of the space.

Storage buildings smaller than 150 square feet and not located in a regulated floodway (the floodway is described in more detail below and on page 9 of this report) do not require a development permit but must still be built under the same floodplain standards given above.

Floodways are areas of the SFHA that are typically adjacent to a waterway and are considered extremely hazardous areas due to the velocity of flood waters which carry debris, possible projectiles and erosion potential. Fill dirt, new construction, substantial improvements and other development within the regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed development will increase the flood levels within the community during a 1% annual chance flood. A no-rise certificate is required by Guadalupe County for all development in a floodway. The no-rise certificate can be obtained from the Guadalupe County Department of Environmental Health.

C. Alamo Area Council of Governments (AACOG) Hazard Mitigation Plan, March 1, 2005: The AACOG Regional Mitigation Plan (“The Plan”) discusses several flooding issues. According to The Plan, Guadalupe County has: 12,549 people; 3,688 single family buildings valued at $760,608,000; 51 multi-family buildings valued at
$52,044,000; 22 commercial buildings valued at $84,342,000; and 1 critical facility valued at $4,275,000, at risk from flooding. The total annualized loss by flooding in Guadalupe County is reported to be $901,269,000.

Flooding as a result of dam failure is addressed. While The Plan notes that there has never been a complete dam failure in the Alamo Region, there was historical evidence of floodwaters spilling over dams and increasing flooding downstream. Of these events, the most notable was the July 2002 flood when water from the Canyon Reservoir topped the spillway in Comal County, which is north of Guadalupe County, resulting in massive flooding throughout New Braunfels and Seguin.

Each participating county and city developed individual mitigation actions to address the hazards facing their particular communities. Guadalupe County identified eight mitigation actions that would affect the Lake Placid study area. These mitigation actions are as follows:

- Upgrade or add stream and rain gauges at USGS and GBRA sites
- Implementing a flood early warning system and response plan
- Adopting and promoting the Association of State Floodplain Managers “No Adverse Impact” policy
- Prohibit dumping debris or placing fill in waterways, streams, and ditches
- Install flood warning/telemetry systems with controls located above BFE at sewage lift stations
- Implement an area-wide telephone Emergency Notification System (Reverse 911)
- Enhance code enforcement and inspection services; provide inspectors with FEMA “Mitigation Resources to Success” CD
- Establish uniform emergency response procedures with the operators of critical facilities/harden critical care facilities.

These mitigation actions, including the responsible department and completion schedule, are summarized in Table 1.

In accordance with National Flood Insurance Program (NFIP) rules, hazard mitigation plans must be updated every five years. Since this plan was approved in March of 2005, the updated plan should be in process. In order for mitigation projects to be considered for funding opportunities, they should be listed in the hazard mitigation plan.

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II. Flood Insurance Data

A. Flood Insurance Rate Map, November 2, 2007: A Flood Insurance Rate Map (FIRM), published by FEMA, shows potential flood risk according to zones of severity and is used in setting flood insurance rates. The regulatory floodplain used by FEMA for the floodplain management and insurance aspects of the National Flood Insurance Program is based on the elevation of the 100-year flood. It may be easily misconstrued that the 100-year flood happens only once in 100 years. In actuality, the 100-year flood has a 1% chance of occurring in any given year while the 10-year flood has a 10% chance of occurring in a given year.
The Lake Placid analysis area falls in both AE (more risky) and X (less risky) flood zones, and in the Guadalupe River floodway. The floodway is an area that must be kept free of encroachments so that the 1% annual chance flood can occur without substantially increasing the flood heights. When someone submits plans to build a house in the floodway in Guadalupe County, they must fill out a Floodplain development permit application and obtain a no-rise certificate, which demonstrates that the proposed structure will not increase flood heights in the area, from a professional engineer.

Figure 2 shows the portion of the Guadalupe County FIRM for the Lake Placid analysis area.

The base flood elevation (BFE) is the elevation of the 100-year flood above sea level. In Guadalupe County, one foot above the BFE is the lowest elevation to which a homeowner can build a house. The BFE for the Lake Placid area is between 515-518 feet above sea level. The ground elevation ranges between 500 and 510 feet above sea level, so the BFE may be up to 18 feet above the ground in some places. Only a licensed surveyor can determine the ground elevation at a specific location, so that the BFE and the required lowest floor elevation can be determined for new construction.

Claims Data: The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are

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7 The Floodplain Development Permit Application can be found on the Guadalupe County website: [http://www.co.guadalupe.tx.us/env_health/Dev_Permit_App.pdf](http://www.co.guadalupe.tx.us/env_health/Dev_Permit_App.pdf)
included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data are used for floodplain management, mitigation, or research purposes. Therefore, this report does not identify the repetitive loss properties or include claims data for any individual property. Rather, it discusses them only in summary form.

The UNO-CHART Team obtained claims data from FEMA Region VI for all repetitive flood loss properties in the Lake Placid study area. There are 95 (38%) properties within the 248 property study area that qualify as repetitive loss. As described in Table 2 the homeowners for the 95 repetitive loss properties have received $14,639,467.74 in flood insurance payments since 1978. The average repetitive flood loss flood claim is $60,744.68. The most costly flood event was in October 1998. Sixty-eight of the 95 repetitive flood loss properties (approximately 72%) made flood claims totaling $6,151,389.25 for this event.

It is likely that the data in this section understate the flooding problem for four reasons, including:

1. NFIP records do not include claims data prior to 1978, so there could have been additional losses not shown here.
2. Policy holders may not have submitted claims for smaller floods for fear of it affecting their coverage or their premium rates.
3. Only data for insured properties were reviewed. There could be other properties that have been repeatedly flooded, but did not have insurance at the time of the flood or did not submit claims.
4. The losses only account for items covered by the insurance policy. Things not covered include living expenses during evacuation, swimming pools, and automobiles.

**Major Flood Events**: There have been three major flood events in the study area: October 1998, July 2002, and November 2004. Table 2 shows that these three events produced the highest number of flood claims and the highest claims totals. The normal flow of water at the United States Geologic Survey (USGS) gauge site on the Guadalupe River in New Braunfels is between 830 and 10,900 cubic feet per second (cfs). The normal flow of water at the National Weather Service (NWS) gauge on the Guadalupe River in Seguin is 1,200 cfs, and the maximum flow of water that the Lake Placid Dam (TP-4) can release is 30,000 cfs. As seen in Table 3, for all three of these major flooding events the flow of

<table>
<thead>
<tr>
<th>Claim Date(s) per event</th>
<th>Number of claims per event</th>
<th>Claims totals per event</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/9/1990</td>
<td>1</td>
<td>$3,803.09</td>
</tr>
<tr>
<td>5/14/1994</td>
<td>1</td>
<td>$1,324.71</td>
</tr>
<tr>
<td>10/17 - 19/1998</td>
<td>68</td>
<td>$6,151,389.25</td>
</tr>
<tr>
<td>7/1-7/2002</td>
<td>87</td>
<td>$4,056,358.21</td>
</tr>
<tr>
<td>6/9/2004</td>
<td>5</td>
<td>$125,351.41</td>
</tr>
<tr>
<td>11/15/2004</td>
<td>1</td>
<td>$59,593.54</td>
</tr>
<tr>
<td>11/22-24/2004</td>
<td>74</td>
<td>$4,116,640.80</td>
</tr>
<tr>
<td>7/20/2007</td>
<td>2</td>
<td>$52,669.75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$14,567,130.76</strong></td>
</tr>
</tbody>
</table>

Table 2: Repetitive Flood Loss Claims
water in the Guadalupe River greatly exceeded the allowable cfs at each of these sites, resulting in river water heights much higher than the normal stages.

III. Dam Information

There are several dams along the Guadalupe River near the study area that regulate the water level of the river. The northernmost dam, the Canyon Dam, is located on Canyon Lake, upstream of New Braunfels, TX on mile 303 of the Guadalupe River at the edge of the Balcones Escarpment. The Canyon Dam is owned and operated by the U.S. Army Corps of Engineers, and was constructed for flood control and water conservation purposes. The four dams along the Guadalupe River near the study area are owned and operated by the Guadalupe-Blanco River Authority (GBRA). The GBRA dams are all hydroelectric dams, meaning that their main purpose is to generate electricity. However, these dams do serve a flood control role during heavy rain events. Figure 3 illustrates the location of the four dams near the study area.

<table>
<thead>
<tr>
<th></th>
<th>USGS gauge in New Braunfels</th>
<th>NWS gauge in Seguin</th>
<th>TP-4 Dam (Lake Placid)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cfs*</td>
<td>level**</td>
<td>cfs</td>
</tr>
<tr>
<td>October 1998</td>
<td>200,315</td>
<td>38.54’</td>
<td>99,000</td>
</tr>
<tr>
<td>July 2002</td>
<td>53,700</td>
<td>29.66’</td>
<td>52,000</td>
</tr>
<tr>
<td>November 2004</td>
<td>28,600</td>
<td>22.24’</td>
<td>45,000</td>
</tr>
</tbody>
</table>

Table 3: Major Flood Events and Gauge Readings

* “cfs” refers to cubic feet per second, the means by which water flows are measured.
** “level” refers to the height of the river above the normal stage.
*** Although dams do not normally measure a flow as they are intended to hold back a volume of water, here the “cfs” mentioned are the flow of water over the dam during the flooding events.
The landscape along the upper Guadalupe River contains high canyons giving the river channel a capacity of 40,000 to 50,000 cubic feet per second (cfs), while the lower Guadalupe River channel’s capacity is only 13,000 to 30,000 cfs. These geographic discrepancies lead to an increased flood risk for the lower portion of the Guadalupe River, where the Lake Placid Area lies. The Canyon Dam was constructed for two purposes, (1) to offer flood protection to the lower portion of the Guadalupe River, and (2) for water conservation. Canyon Dam is designed to control floods originating within the 1432 sq. miles of drainage above the dam.
Canyon Lake is also known as Canyon Reservoir. The Reservoir was created by the Canyon Dam and is owned by the Corps. There are two “pools” within the Reservoir: the conservation pool and the flood control pool. The conservation pool consists of water stored in the Reservoir up to 909 feet above mean sea level (msl). The GBRA owns the rights to this water which is to be used for operating several small hydroelectric plants located downstream of New Braunfels, and for water supply and irrigation. The Corps owns the rights to and manages the flood control pool, which consists of water located in the reservoir between 909 feet and 943 feet above msl. The flood control pool is usually kept empty so that it can store floodwaters resulting from heavy rain events located upstream of the reservoir. The Corps releases floodwaters from the flood control pool as soon as possible, but in intervals that will not overload the dams located downstream of the Canyon Dam.

The dams downstream of Canyon Dam are owned and operated by the GBRA. These dams: Dunlap, Mc Queeney, Placid, and Nolte can release up to 30,000 cfs, and the Canyon can only release up to 5,000 cfs, so flooding in the study area is not supposed to occur as a result of releases from Canyon Dam. However, there is no “coordination system” between the Corps and the GBRA in place. Flooding in the study area is a concern when heavy rain events occur below the Canyon Dam, but upstream of Lake Placid, or when unusually heavy rain events cause the flood control pool in Canyon Reservoir to overflow the banks of the spillway, as occurred in July 2002. When the GBRA dams are fully lowered (12 feet) there is nothing more that the GBRA can do for flood protection.

IV. Flooding Experiences of Homeowners

As previously mentioned, the letter to the residents living in the Lake Placid analysis area from Guadalupe County included a data sheet. Of the 247 properties to which letters were sent, 48 (19%) were returned as “undeliverable”. In total, 50 residents responded, equaling a response rate of 25%, which is about average for this type of research. According to the returned data sheets, 46% of the respondents moved to the study area since 2000. About 2/3 of the respondents live in houses that are on slab foundations, and the remaining 1/3 are on posts/piles. Eighty-two percent of the respondents have had flooding problems, 22% with water between six and ten feet inside the house, for up to 48 hours. Most respondents feel that the source of their flooding is the nearby river, and several homeowners have already taken some sort of flood protection measure such as moving utilities to a higher level or elevating the house above the flood level. Eighty-eight percent of the respondents have a flood insurance policy, and 68% are interested in learning more about mitigation. Residents consistently mentioned in the general comments section that dam coordination/management is a challenge, and that debris near the dams is common, blocking the flow of water. Residents are also concerned that there is a challenge in maintaining public (State and County owned) right-of-ways.

The full results are given in Appendix C.
V. On-Site Data Collection

On March 18-19, 2009, a team from UNO-CHART, along with a representative of the Texas Water Development Board, visited the Lake Placid analysis area and collected information about each property. Approximately 2/3 of the houses in the study area are on slab foundations, and the remaining 1/3 are on piers/piles. Many houses are wood frame, although there are several mobile homes and stucco homes as well. Sixty-five percent of the houses are one-story structures, and the first floor of living space in 71% of the houses is between half of one foot below the street level and one foot above the street level. This means that many of the front yards tend to slope down from the street. The first floor of living space is between grade level and one foot above grade in 65% of the houses in the study area, however 18% of the houses in the study area are elevated between 10 and 15 feet above grade. The data collected by the team are presented in Appendix D.

Problem Statement

Based on the data collected from the five sources of information (community information, flood insurance data, dam information, flooding experiences of homeowners, and on-site data collection) the following bullets summarize the repeated flooding problems in the Lake Placid area:

- Flooding is due to heavy rain events
- There are two situations that produce flooding
  - A rain event so heavy that it causes the Canyon Reservoir’s flood control pool to overflow its spillway
  - A heavy rain event that occurs south of Canyon Reservoir, but north of the study area.
- Homes in the study area fall within three flood zones: the less risky X flood zone; the more risky A flood zone; and the Guadalupe River floodway, an area that should be reserved for flooding.
- There are 95 repetitive flood loss properties as defined by FEMA in the study area, indicating that the neighborhood has a history of repetitive flooding.
- Residents’ report varied flood depths ranging from in the yard only to up to 10 feet inside homes, for up to 48 hours.
- Residents are concerned that the dams are not properly coordinated and that debris near the dams blocks the release of water.

Step 3: Mitigation Measures

Knowing the flooding history, and types and condition of the buildings in the area leads to the third step in the area analysis procedure – a review of alternative mitigation approaches to protect properties from, or reduce, future flood damage. Property owners should look at these alternatives but understand they are not all guaranteed to provide protection at different levels of flooding. Five approaches were reviewed:
I. Elevating the houses above the 100-year flood level
II. Constructing small berms or floodwalls around one or more houses
III. Dry floodproofing
IV. Higher regulatory standards
V. The flood alert system
VI. Maintaining flood insurance coverage on the building

I. Elevation

Raising the structure above the flood level is generally viewed as the best flood protection measure, short of removing the building from the floodplain. All damageable portions of the building and its contents are high and dry during a flood, which flows under the building instead of into the house. Houses can either be elevated on fill, posts/piles, or a crawlspace. A house elevated on fill requires adding a specific type of dirt to a lot and building the house on top of the added dirt. A house elevated on posts/piles is either built or raised on a foundation of piers that are driven into the earth and rise high enough above the ground to elevate the house above the flow of flood water. A house elevated on a crawlspace is built or raised on a continuous wall-like foundation that elevates the house above the flood level. If a crawlspace is used, it is important to include vents or openings in the crawlspace that are appropriately sized: one square inch for each square foot of the building’s footprint. Figures 4 and 5 show elevated houses in the Lake Placid area.

A. Cost: Most of the cost to elevate a building is in the preparation and foundation construction. The cost to elevate six feet is little more than the cost to go up two feet. Elevation is usually cost-effective for wood frame buildings on posts/piles because it is easiest to get lifting equipment under the floor and disruption to the habitable part of the
Elevating a slab house is much more costly and disruptive. Approximately 2/3 of the houses in the Lake Placid study area are on a slab. The actual cost of elevating a particular building depends on factors such as its condition, whether it is masonry or brick faced, and if additions have been added on over time.

While the cost of elevating a home on a slab can be high, there are funding programs that can help. The usual arrangement is for a FEMA grant to pay 75% of the cost while the owner pays the other 25%. In the case of elevation, the homeowner’s portion could be as high as $25,000 or more. In some cases, assistance can be provided by Increased Cost of Compliance funds, which is discussed on page 25, or state funds.

**B. Feasibility:** Federal funding support for an elevation project requires a study that shows that the benefits of the project exceed the cost of the elevation. Project benefits include savings in insurance claims paid on the structure.

Elevating a masonry home or a slab can cost up to $100,000, which means that benefit/cost ratios may be low. Looking at each property individually could result in funding for the worst case properties, i.e., those that are lowest, subject to the most frequent flooding, and in good enough condition to elevate.

**II. Barriers to Floodwaters**

Small floodwalls, levees, or berms could be constructed around one or more properties if flood depths are less than three feet. Small floodwalls are appropriate for some homes in the Lake Placid area. Homes that typically receive three feet of floodwater, or less, above the ground can benefit from small floodwalls, levees or berms. Given the flood depths reported by residents on the returned data sheets barriers would be an appropriate mitigation measure for some homes in the Lake Placid analysis area. According to the returned data sheets, 18% of respondents experienced up to three feet of floodwater inside their homes. Levees and berms are more suitable for larger lots, and small floodwalls that are located close to the house are appropriate for suburban style neighborhoods with front and side yard space. Both types of lots are found in the study area. If a floodwall is built around a house, it is important to include a sump pump with a backup generator so that rainwater can be pumped to the outside of the protected space. An engineer should be consulted before beginning a floodwall project, and residents should contact the County office of Environmental Health to inquire about a permit. Figures 6 and 7 show examples of a floodwall and sump pump.
Soil permeability is a flooding concern. Permeable soil will allow floodwaters to seep under the barrier. This is a particular problem when floodwaters stay up for a long time. As seen on the soils map in Figure 8, the soil type found in the Lake Placid area is called Trinity-Sunev-Seguin-Bosque. This type of soil is not very permeable, which is preferable for a barrier such as a small floodwall. It is not likely that floodwaters will seep under a barrier constructed in an area with this type of soil unless the floodwaters remain over a week's time. According to the returned data sheets, the longest time that floodwaters remained was 48 hours, therefore the soil in the Lake Placid analysis are is conducive to building a small floodwall. If a homeowner is interested in constructing a small floodwall, it is advised to consider historical flood durations and to have the soil on site tested to determine the permeability.

Homeowners who are interested in constructing a barrier to protect their house should consider the following requirements:

- A method to close openings, such as the driveway in the photo in Figure 3-3. Generally, this requires “human intervention,” meaning someone needs to be available and have enough time to take action.
- Relatively impervious soils to minimize seepage under the floodwall.
- A system to prevent sanitary sewer backup from flowing into the building.
- A system of drain tile (perforated pipes) that collects water that falls or seeps into the protected area and sends it to a collecting basin or “sump.”
- A sump pump to send the collected water outside the barrier.
- Power to operate the sump pump around the clock during a storm.
**A. Cost:** The cost of a local barrier depends on the depth of flooding and the amount of engineering put into the design. Where flooding is only inches deep and of short duration, almost any barrier of concrete or earth will work.

The most conservative cost estimate for a floodwall is based on a two foot high engineered cantilevered concrete floodwall. A cantilevered wall has a footing to provide stability and keep the water pressure from pushing it over.

The budget shown in Table 4 is for a 40’x 40’ home with a wall one foot outside the building wall. Labor accounts for about half of the price in the cost estimate.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Foot high reinforced concrete cantilever wall, 168 feet @ $200/foot</td>
<td>$33,600</td>
</tr>
<tr>
<td>Internal drainage and sump pump system</td>
<td>5,000</td>
</tr>
<tr>
<td>Sewer backup valve</td>
<td>4,500</td>
</tr>
<tr>
<td>Generator for power outages</td>
<td>900</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$44,000</strong></td>
</tr>
</tbody>
</table>

*Figure 8: Soils map for the Lake Placid Study Area*
It should be noted that smaller, non-engineered walls such as the ones in Figures 6 and 7 have been built by their owners for less than $10,000.

FEMA does not fund individual floodwalls for residential properties; therefore, the homeowner must pay 100% of the cost for a floodwall. However, each property owner can determine how much of their own labor they want to contribute and whether the cost of the wall is worth the protection from flooding that it provides.

It is worth mentioning that constructing larger levees along the river is not advisable. First, there is little room along the shore for such structures which require six feet of ground space per foot of levee height. Also, the shoreline falls in the floodway and according to County regulations, development in the floodway is prohibited unless a no-rise certificate is completed. A no-rise certificate cannot be issued for a flood control structure, as levees would simply increase flooding upstream. Finally, levees along the shoreline will destroy the lake Placid area lake culture, essentially cutting area residents off from the water.

III. Dry Floodproofing

This measure keeps floodwaters out of a building by steps taken to protect the building directly. Walls are coated with waterproofing compounds or plastic sheeting. Openings (doors, windows, and vents) are closed either permanently, or temporarily with removable shields or sandbags.

A floodproofing project has three components:

- Make the walls watertight. This is easiest to do for masonry or brick faced walls. The brick or stucco walls can be covered with a waterproof sealant and bricked or stuccoed over with a veneer to camouflage the sealant. Houses with wood, vinyl, or metal siding need to be wrapped with plastic sheeting to make walls watertight, and then covered with a veneer to camouflage and protect the plastic sheeting.
- Provide closures for the openings; including doors, windows, dryer vents and weep holes; such as removable shields or sandbags.
- Account for sewer backup and other sources of water entering the building. For shallow flood levels, this can be done with a floor drain; although a valve system is more secure.
As seen in Figure 9, dry floodproofing employs the building itself as part of the barrier to the passage of floodwaters, and therefore this technique is only recommended for buildings with slab foundations that are not cracked. The solid slab foundation prevents floodwaters from entering a building from below. Also, even if the building is in sound condition, tests by the Corps of Engineers have shown that dry floodproofing should not be used for depths greater than 3 feet over the floor, because water pressure on the structure can collapse the walls and/or buckle the floor. Dry floodproofing is a mitigation technique that is appropriate for some houses in the Lake Placid area: those with slab foundations that typically receive floodwater up to three feet in the house.

Approximately 2/3 of the houses in the analysis area are on slab foundations, and according to the data sheet responses, 18% of the respondents experienced at most three feet of flooding.

Not all parts of the building need to be floodproofed. It is difficult to floodproof a garage door, for example, so some owners let the garage flood and floodproof the walls between the garage and the rest of the house. Appliances, electrical outlets, and other damage-prone materials located in the garage should be elevated above the expected flood levels. Examples of floodproofed houses can be seen in Figures 10 through 13.

Dry floodproofing has the following shortcomings as a flood protection measure:

- It usually requires human intervention, i.e., someone must be home to close the openings.
- Its success depends on the building’s condition, which may not be readily evident. It is very difficult to tell if there are cracks in the slab under the floor covering.
- Periodic maintenance is required to check for cracks in the walls and to ensure that the waterproofing compounds do not decompose.
- There is no government financial assistance programs available for dry floodproofing, therefore the entire cost of the project must be paid by the homeowner.
- The NFIP will not offer a lower insurance rate for dry floodproofed residences.
A. Cost: The cost for a floodproofing project can vary according to the building’s construction and condition. It can range from $5,000 to $20,000, depending on how secure the owner wants to be. Owners can do some of the work by themselves, although an experienced contractor provides greater security. Each property owner can determine how much of their own labor they can contribute and whether the cost and appearance of a project is worth the protection from flooding that it may provide.

B. Feasibility: As with floodwalls, floodproofing is appropriate where flood depths are shallow and are of relatively short duration. It can be an effective measure for some of the structures and flood conditions found in the Lake Placid analysis area. It can also be more attractive than a floodwall around a house.

IV. Higher Regulatory Standards

The Guadalupe County Floodplain Order (discussed on page 6 of this report) exceeds the basic NFIP requirements in one area. The Order states that the County has adopted a one-foot freeboard rule, which means that all new or substantially improved structures
must be built or elevated at least one foot above BFE. This rule is the only higher regulatory standard adopted by the County. Additional higher regulatory standards that the county could adopt include a cumulative substantial damage ordinance and enclosure limitations.

A cumulative substantial damage/improvement ordinance states that for each time a structure is damaged and repaired, and/or renovated, the percentage of improvement to the structure is recorded and added to previous percentage of damage repairs and/or renovations. When the structure reaches the 50% improved threshold it must be brought into compliance with current flood and building codes. The benefit to homeowners is that structures in communities with cumulative substantial damage/improvement ordinances reach the 50% improved threshold sooner and thus qualify for Increased Cost of Compliance (ICC) payments sooner. ICC payments can be used for bringing a flood damaged structure into compliance with current codes. ICC payments are discussed in more detail on page 25 of this report.

Enclosure limitations can range from prohibiting any enclosed space below the lowest floor of living space, to requiring the homeowner to sign a non-conversion agreement promising not to improve, finish or otherwise convert appropriately enclosed space located below the lowest floor of living space. Enclosure limitations discourage owners of houses built over eight feet above the ground from converting an enclosed space below the lowest floor of living space into a usable room, which is prohibited. The community may decide to only enforce enclosure limitations for structures elevated five feet or more above the ground, as spaces less than five feet tall are not typically enough for usable space.

V. Flood Alert System: The United States Geological Survey (USGS), with the cooperation of the Guadalupe-Blanco River Authority (GBRA), the US Army Corps of Engineers (USACE), and the National Weather Service (NWS), maintains a large network of stream level sensors and rain gauges throughout the Guadalupe River Basin. According to the Guadalupe County Department of Emergency Management website, during heavy rain and major flood events the GBRA receives the latest river forecasts from the NWS – River Forecast Center which it then consolidates and sends out to the local Emergency Management Coordinator.

Since 2007, the Guadalupe County Office of Emergency Management has operated a voluntary telephone notification system to alert residents of flooding conditions in their area. Residents are asked to provide up to two telephone numbers – traditional landlines, cellular telephones, or cable lines – on which they can be reached, as well as the location of their waterfront and/or Zone A property, and their email address. The residents must register with the Guadalupe County Office of Emergency Management and alert the Office if they move, or change phone numbers. There is also an automated graphical telephone callout system which locates the area in danger on an electronic map, then dials

8 http://www.co.guadalupe.tx.us/emgmt/emerg_notify.htm
all the landlines in the area to deliver the warning. No sign up is necessary for this alert system; the only requirement is that the residents have a landline.

There are also 23 emergency notification sirens placed throughout Guadalupe County; most of which are positioned in areas subject to severe flooding. Once the sirens are sounded, residents should tune into KWED 1580 AM for more instructions. KWED 1580 AM can also be heard on cable channel 21 in Seguin. KWED 1580 AM is partnered with GBRA and Guadalupe County to broadcast vital information and warnings during hazardous events.

When the various river and rain gauges indicate that the flow over any of Guadalupe County’s hydroelectric dams (Dunlap, McQueeny, Lake Placid/TP-4, and Nolte) is over 5,000 cfs the voluntary telephone notification system is activated for waterfront, Zone A properties. At the same time, KWED 1580 AM will begin broadcasting a message telling residents of the situation and advising waterfront residents in Zone A to take the necessary actions such as the movement of boats and other items near the waterfront. When the flow of the river has reached or is anticipated to reach 10,000 cfs at any hydroelectric dam in the county, or if the USGS gauge in New Braunfels indicates a flow of 5000 cfs and rising, the voluntary telephone notification system will call residents in the entire county. The Emergency Sirens will also sound with one cycle, and KWED 1580 AM will alert waterfront residents to take the appropriate action. When the flow has reached or is anticipated to reach 20,000 cfs at any county hydroelectric dam, or when the flow at the USGS gauge in New Braunfels reaches 10,000 cfs, the automated graphical alert system will call all residents. The Emergency Sirens will sound for one cycle, followed by one minute of silence before sounding a second cycle and will repeat every half hour until conditions are stabilized. KWED 1580 AM will broadcast situation reports and advise residents of the appropriate actions to take.

Flood Preparedness Plan: It is important to develop and write down a flood preparedness plan. Given that the area is prone to flash flooding, residents may not have an abundant amount of time once the warning has been issued; this is why it is strongly recommended that plans be written down, and kept in an easy to find place.

The first step is to make a record of all personal property. Most insurance companies will have an inventory sheet that residents can use, as does FEMA. Residents should fill out an inventory sheet, take pictures and/or video of their belongings and keep copies of this vital information in a safe place away from the threat of floods.

The next step will be to locate a safe place to evacuate to once the warning has been issued. This can be a friend’s house, a hotel/motel, an emergency shelter, or a relative’s place outside of the flood risk. If a resident has a pet, they need to be aware that due to health codes, pets are not allowed in emergency shelters. Therefore, it is imperative that residents be aware of this and that they make alternative plans for their pet(s). Once a safe place has been located, tests drive the route. The Lake Placid Area is known to have water covering the streets during rain events, so residents should know what route to take to minimize risk.
Next, residents should develop a checklist of sorts to go through as they are preparing to leave their homes. This list should include implementing any mitigation or preventative measures before leaving the residence; such as sandbagging, placing protective barriers in place, and turning off the gas. The list should also include moving clean-up supplies to a higher location so they are safe from the water, as well as moving all outside furniture and equipment to a safe place. Each resident will have things on their lists that are unique to their situation; this list is to serve only as an outline. For more information, residents can visit their local Red Cross or the Guadalupe County Office of Emergency Management.

VI. Flood Insurance

Although not a mitigation measure that reduces property damage from a flood, a National Flood Insurance Program policy has the following advantages for the homeowner or renter:

- A flood insurance policy covers surface flooding from the overflow of inland or tidal waters or from storm water runoff.
- Flood insurance may be the only source of assistance to help owners of damaged property pay for cleanup and repairs.
- Once in effect there is no need for human intervention.
- Coverage is available for the contents of a home as well as for the structure.
- Renters can buy contents coverage, even if the building owner does not buy coverage for the structure itself.

A. Cost: Flood insurance rates are based on several factors including what flood zone the building falls in and the age of the structure. Generally, homes in the X zone have lower flood insurance rates than those in the AE zone, because the X zone is supposed to indicate a lower risk from flooding. The homes in the study area fall in two different flood zones: AE and X500, as well as in the Guadalupe River floodway. Guadalupe County homes constructed before March 1, 1979, are “pre-FIRM” buildings, which means that they were built before the date of the first FIRM for the community, and are thus eligible

<table>
<thead>
<tr>
<th>Building Exposure</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Special Flood Hazard Area (AE Zone)</td>
<td></td>
</tr>
<tr>
<td>Pre-FIRM (“subsidized”) rate</td>
<td>$1,618</td>
</tr>
<tr>
<td>Post-FIRM (actuarial) rates</td>
<td></td>
</tr>
<tr>
<td>2 feet above the base flood elevation</td>
<td>$400</td>
</tr>
<tr>
<td>1 foot above the base flood elevation</td>
<td>$582</td>
</tr>
<tr>
<td>At the base flood elevation</td>
<td>$1,054</td>
</tr>
<tr>
<td>1 foot below the base flood elevation</td>
<td>$3,945</td>
</tr>
<tr>
<td>Outside the Special Flood Hazard Area</td>
<td>$979</td>
</tr>
</tbody>
</table>

Premiums are for $150,000 in building coverage and $75,000 in contents coverage for a one story house with no basement and a $500 deductible, using the October 2008 Flood Insurance Manual. Premiums include the 10% Community Rating System discount in unincorporated Guadalupe County.

There is a 30-day waiting period for a new flood insurance policy before it goes into effect.
for the “subsidized” flood insurance premium rates. A building that is located in the ‘A’
flood zone and constructed or substantially improved after the date of the most current
FIRM - such as one built or substantially improved in 2009, is supposed to have been
built above the flood level and is therefore subject to rates based on the actual risk rather
than a subsidized rate. Rates on pre-FIRM buildings are subsidized because the flood
risk was unknown at the time of construction.

Table 5 shows the rates for a policy with $150,000 coverage on the building. For
example, a house built in 1975 that meets the BFE with a $150,000 building/$60,000
contents policy will cost the homeowner approximately $1,100 annually to insure. If a
pre-FIRM house in the AE zone is elevated to 1 foot above the BFE, the owner will
be able to take advantage of the much lower post-FIRM rates, approximately $600
annually.

B. Community Rating System (CRS): The Community Rating System is a “voluntary
incentive program that recognizes and encourages community floodplain activities that
exceed the minimum National Flood Insurance Program (NFIP) requirements.”
(www.FEMA.gov) Participating communities are rewarded with reduced insurance
premiums. Guadalupe County participates in the CRS and is currently rated as a Class 8,
which means that properties in the A zone receive a 10% reduction in their insurance
premiums.

See the Table 6 for a summary of the mitigation measures presented in this report.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevation</td>
<td>More secure flood protection</td>
<td>High cost</td>
</tr>
<tr>
<td></td>
<td>Flood insurance rate reduction</td>
<td>Need source of non-FEMA cost share</td>
</tr>
<tr>
<td>Floodwalls</td>
<td>Effective for shallow flooding</td>
<td>Subject to seepage if water stays up for a long time</td>
</tr>
<tr>
<td>Dry Floodproofing</td>
<td>Low cost</td>
<td>Exposes homes to wall/floor damage</td>
</tr>
<tr>
<td></td>
<td>Effective for shallow flooding on slab foundations</td>
<td></td>
</tr>
<tr>
<td>Higher Regulatory Standards</td>
<td>Cumulative substantial damage/improvement ordinance makes it easier for homeowners to qualify for ICC funding</td>
<td>Enforcing enclosure limitations can be time consuming</td>
</tr>
<tr>
<td>Flood Insurance</td>
<td>In effect as long as policy is renewed</td>
<td>Does not prevent flood damage (but does provide funds for repairs)</td>
</tr>
<tr>
<td></td>
<td>Works for all flood levels</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Under ICC, can be a source of funds for elevation</td>
<td></td>
</tr>
</tbody>
</table>
VII. Funding

There are several possible sources of funding for mitigation projects:

A. FEMA programs: Most of the FEMA programs provide 75% of the cost of a project. The owner is expected to fund the other 25%. Each program has different Congressional authorization and slightly different rules. For example, some do not fund reconstruction projects as described above. The most active program currently is the Hazard Mitigation Grant Program (HMG). Guadalupe County uses the HMG for elevation and reconstruction projects. The Office of Environmental Health manages the applications process for the County.

B. Flood insurance: There is a special funding provision in the National Flood Insurance Program (NFIP) for insured buildings that have been substantially damaged by a flood, “Increased Cost of Compliance.” ICC coverage pays for the cost to comply with floodplain management regulations after a flood if the building has been declared substantially damaged. ICC will pay up to $30,000 to help cover elevation, relocation, demolition, and (for nonresidential buildings) floodproofing. It can also be used to help pay the 25% owner’s share of a FEMA funded mitigation project.

The building's flood insurance policy must have been in effect during the flood. This payment is in addition to the damage claim payment that would be made under the regular policy coverage, as long as the total claim does not exceed $250,000. Claims must be accompanied by a substantial or repetitive damage determination made by the local floodplain administrator. For more information, contact the insurance agent who wrote your flood insurance policy or visit www.fema.gov/plan/prevent/floodplain/ICC.shtm. Coverage under the ICC does have limitations:

- It covers only damage caused by a flood, as opposed to wind or fire damage
- The building’s flood insurance policy must have been in effect during the flood
- ICC payments are limited to $30,000 per structure
- Claims must be accompanied by a substantial or repetitive damage determination made by the local floodplain administrator
- The Structure must be located in an A Zone

C. Rebates: A rebate is a grant in which the costs are shared by the homeowner and another source, such as the local government, usually given to a property owner after a project has been completed. Many communities favor it because the owner handles all the design details, contracting, and payment before the community makes a final commitment. The owner ensures that the project meets all of the program’s criteria, has the project constructed, and then goes to the community for the rebate after the completed project passes inspection.
Rebates are more successful where the cost of the project is relatively small, e.g., under $5,000, because the owner is more likely to be able to afford to finance the bulk of the cost; the rebate acts more as an incentive, rather than as needed financial support.

More information on rebates can be found in the Corps of Engineers’ report *Local Flood Proofing Programs* found at https://www.nwo.usace.army.mil/nfpc/docs/Local_FP_Programs_February_2005.pdf.

**D. Small Business Administration Mitigation Loans:** The Small Business Administration (SBA) offers mitigation loans to SBA disaster loan applicants who have not yet closed on their disaster loan. Applicants who have already closed must demonstrate that the delay in application was beyond their control. Measures eligible for SBA mitigation loans may only protect real estate property, not personal items, from the same type of future declared disaster. For example mitigation loans made following a flood can only be used for a measure to protect against future flooding, not a tornado. If the measure existed prior to the declared disaster, an SBA mitigation loan will cover the replacement cost. If the measure did not exist prior to the declared disaster the mitigation loan will only cover the cost of the measure if it is deemed absolutely necessary for repairing the property by a professional third-party, such as an engineer. For more information on SBA mitigation loans, please contact disastercustomerservice@sba.gov.

Appendix E details mitigation grants and other funding opportunities.

**Step 4: Coordination**

Coordinating with relevant agencies, offices, and organizations is an important step in the analysis process. This step helps to open lines of communication among those interested in flood protection in the Lake Placid area and to see what other groups are addressing the areas flood problems.

The following agencies and organizations were contacted by the UNO-CHART team in order to complete this analysis report:

- FEMA Region VI, Mitigation Office
- Texas Water Development Board, Flood Mitigation Planning Division
- Guadalupe County, Department of Environmental Health
- Guadalupe County, Department of Emergency Management
- Guadalupe County, GIS Department
- Citizens United for Lake Placid
- Guadalupe-Blanco River Authority (GBRA)

**Step 5: Findings**

Flooding in the Lake Placid area is usually the result of a heavy rain event occurring downstream of the Canyon Dam, but upstream of the analysis area.
The stormwater from such events can sometimes overwhelm the dams along the Guadalupe River near Seguin. Another cause of flooding in the Lake Placid area is a rain event so heavy that the flood control pool of the Canyon Reservoir overflows, as occurred in 2002. Lake Placid area residents report that coordinating the releases among the various dams located along the Guadalupe River is sometimes a challenge, resulting in increased flooding, as well as the accumulation of debris along the dams reducing the amount of water released by the dams. Although the GBRA dams are designed to be able to easily release the amount of water that is released by the Corps’ Canyon Dam, a communication system between the Corps and the GBRA could be established to help ensure that the GBRA is adequately prepared for releases made by the Corps. Residents are also concerned that public right-of-ways are not maintained as well as could be. A joint maintenance program between the state, county and neighborhood residents could help make the task of maintaining these public areas more manageable.

There are several mitigation measures that are available to homeowners in the study area. Elevation, dry floodproofing, and flood barriers are all measures that can be implemented on a house by house basis. Elevating a house above the flood hazard offers secure flood protection. Elevation is costly, especially for slab houses, however FEMA funding sources are available for Lake Placid analysis area homeowners. Dry floodproofing is another appropriate measure for slab houses in the Lake Placid area that do not experience flood depths over three feet. Dry floodproofing has the lowest cost of the three options (elevation, dry floodproofing, and flood barriers). Small personal floodwalls are effective for shallow flooding, and the soil types in the study area are conducive for a functioning barrier such as a small floodwall. Neither small floodwalls nor dry floodproofing will protect Lake Placid area homes from flood depths greater than three feet. The Guadalupe County Flood Warning System includes a reverse 911 calling system to homes located in areas in danger of flooding. Residents in the Lake Placid Analysis Area should make sure that they have a land telephone line and that it is working properly so that they can receive the flood warning call.

Flood Insurance is always in effect and works for all flood levels. It will not prevent flood damage, but it will provide funds for repairs. Guadalupe County could explore alternative financing methods (such as a rebate program) to support flood mitigation projects such as dry floodproofing and building small floodwalls.
Report References

- FEMA Region VI Repetitive Loss data
- Guadalupe County Floodplain Order
- Guadalupe County – City of Seguin Interlocal Agreement
- City of Seguin Comprehensive Master Plan
- Alamo Area Council of Governments Hazard Mitigation Plan
- Flood Insurance Rate Map
- Protecting Building Utilities from Flood Damage, FEMA-348, 2000
- Reducing Damage from Localized Flooding – A Guide for Communities. FEMA-511, 2005
- Guadalupe Blanco River Authority website
- Guadalupe County website
- U.S. Army Corps of Engineers, Fort Worth District website
Appendix A: County letter

GUADALUPE COUNTY

LARRY TIMMERMANN
Director
Environmental Health
3605 North Guadalupe
Seguin, Texas 78155
(830) 303-4188 Ext. 250  FAX: (830) 303-4188

Lake Placid Area Resident
<<<Street Address>>>  
Seguin, Texas 78155

RE: Guadalupe County Repetitive Flooding Project

Dear Lake Placid Area Resident,

The Guadalupe County Environmental Health Department is reviewing ways to reduce some of our repetitive flooding problems. One opportunity we have identified is to partner with The University of New Orleans’ Center for Hazards Assessment, Response and Technology (UNO-CHART) to conduct a flood risk assessment in the Lake Placid area.

As part of this project, a team from UNO-CHART is preparing a “local area analysis” for this study area. The approach which they take includes collecting some data specific to your property. UNO-CHART staff was in the area during the day on March 18 - 19, 2009 collecting general information from the street, such as the type of foundation and approximate height of the house above the street.

This work would be greatly improved with additional data that you might be able to provide. Attached is a data sheet that we hope you will complete and return by Friday, May 29, 2009. After you fill the form out, please fold it, tape it, and mail it to the address on the flip side. A stamp has been provided.

After the analysis is completed, some preliminary recommendations will be developed. You will be invited to a meeting with us and the UNO/CHART team to review the findings. The meeting time and location will be advertised once the analysis is near completion.

If you have any questions about this project, please feel free to call Larry Timmermann of the Environmental Health Department at (830) 303-4188, or Sarah Stack at UNO-CHART, at (504) 280-5730.

Thank you for your assistance in helping us to complete this project.

Sincerely,

Larry Timmermann
Larry Timmermann, CFM
Director

Attachment
Appendix B: Data Sheet

Lake Placid Area Repetitive Flooding Analysis
Flood Protection Data Sheet

Name: __________________________

Property address: __________________________, Seguin, TX

1. In what year did you move into the home at this address? __________
   a. Is this residence your permanent home or a vacation home? __________

2. What type of foundation does your house have?
   □ Slab (please answer #4)       □ Crawlspace (please answer #3)       □ Posts/piles (please answer #3)

3. If your house has a crawlspace or post/piles foundation, please indicate how high from the ground your lowest floor of living space is. __________

4. Has the property (your lot) ever been flooded or had a water problem?
   □ Yes (please answer the next question)       □ No (please answer #9)

5. In what year(s) did it flood? __________

6. What was the deepest that the water got?
   □ In yard only: _______ deep, _______ (year) (please answer #8)
   □ Over first floor: _______ deep, _______ (year) (please answer #7)
   □ Water kept out of house or building by sandbagging or other protective measure (please answer #8)

7. What was the longest time that the water stayed in the house? _______ hours or _______ days

8. What do you feel was the cause of the flooding? Check all that affect your building.
   □ Overbank flooding from nearby lake       □ Storm sewer backup
   □ Sanitary sewer backup       □ Standing water next to house
   □ Drainage from nearby properties       □ Other: __________________________

9. Have you taken any flood protection measures on your property? (if you check any of the following please answer #10)
   □ Moved utilities/contents to a higher level
   □ Reregazed yard to keep water away from building
   □ Installed drains or pipes to improved drainage
   □ Sandbagged when water threatened
   □ Elevated all or parts of the building
   □ Waterproofed the outside walls
   □ Built a wall to keep water away
   □ Other: __________________________

10. Did any of the measures checked in item #9 work? If so, which ones? If not, do you know why they didn’t work? __________

11. Do you have Flood Insurance?  □ Yes  □ No

12. Are you interested in pursuing measures to protect the property from flooding?
   □ Yes  □ No  If yes, please visit our website, www.floodhelp.uno.edu. for useful information.

~~ Please return this data sheet by Friday, June 5. ~~
### Appendix C: Data Sheet Results

<table>
<thead>
<tr>
<th>Total Respondents</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>In what year did you move to the home at this address</td>
<td>6% before 1970s 1980s 1990s 2000s</td>
</tr>
<tr>
<td>What type of foundation does your house have</td>
<td>68% Slab 32% Post/piles</td>
</tr>
<tr>
<td>Has the property ever been flooded or have a water problem</td>
<td>82% Yes</td>
</tr>
<tr>
<td>In what years did it flood (multiple answers were allowed)</td>
<td>10% 1972 72% 1998 4% 2002 44% 2004</td>
</tr>
<tr>
<td>What was the deepest the water ever got</td>
<td>18% 0-3 ft House 16% 3-6 ft House 22% 6-10 ft House 6% 0-5 ft Yard 12% 5-10 ft Yard 6% 10-13 ft Yard</td>
</tr>
<tr>
<td>What was the longest time that the water stayed in the house</td>
<td>16% 0-12 hours 22% 12-24 hours 8% 24-48 hours</td>
</tr>
<tr>
<td>What do you feel was the cause of your flooding (multiple answers were allowed)</td>
<td>74% Overbank flooding from nearby river 10% Other: Heavy rain 6% Other: Managing the Dams</td>
</tr>
<tr>
<td>Have you taken any flood protection measures on your property (multiple answers were allowed)</td>
<td>20% Moved Utilities 12% Regarded yard 10% Installed drains or pipes 2% Sandbagged 20% Elevated some or all parts of the house 6% Waterproofed 16% Other</td>
</tr>
<tr>
<td>Do you have flood insurance</td>
<td>88% Yes</td>
</tr>
<tr>
<td>Are you interested in learning more about mitigation</td>
<td>68% Yes</td>
</tr>
</tbody>
</table>
### Appendix D: Windshield Data

<table>
<thead>
<tr>
<th>Total Structures</th>
<th>247</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupied</td>
<td>237</td>
</tr>
<tr>
<td>Vacant</td>
<td>10</td>
</tr>
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<table>
<thead>
<tr>
<th>Foundation type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>66%</td>
</tr>
<tr>
<td></td>
<td>Slab</td>
</tr>
<tr>
<td></td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>Piles/Piers</td>
</tr>
<tr>
<td></td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>Combination slab/piles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Foundation Condition</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Structure Type</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Stucco</td>
</tr>
<tr>
<td></td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>Wood Frame</td>
</tr>
<tr>
<td></td>
<td>37%</td>
</tr>
<tr>
<td></td>
<td>Mobile home</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Structure Condition</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Stories</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>1 Story Home</td>
</tr>
<tr>
<td></td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>1.5 story Home</td>
</tr>
<tr>
<td></td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>2 Story Home</td>
</tr>
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</table>

<table>
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<tr>
<th>Height Above Street</th>
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</thead>
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<td></td>
<td>1%</td>
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<tr>
<td></td>
<td>-15 – -10 Feet</td>
</tr>
<tr>
<td></td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>-10 – -5 Feet</td>
</tr>
<tr>
<td></td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>-5 – 0 Feet</td>
</tr>
<tr>
<td></td>
<td>42%</td>
</tr>
<tr>
<td></td>
<td>0 – 1 Feet</td>
</tr>
<tr>
<td></td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>1 – 2 Feet</td>
</tr>
<tr>
<td></td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>2 – 3 Feet</td>
</tr>
<tr>
<td></td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>3 – 4 Feet</td>
</tr>
<tr>
<td></td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>4 – 5 Feet</td>
</tr>
<tr>
<td></td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>5 –10 Feet</td>
</tr>
<tr>
<td></td>
<td>0.4%</td>
</tr>
<tr>
<td></td>
<td>-1 – 0</td>
</tr>
<tr>
<td></td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>0 – 1</td>
</tr>
<tr>
<td></td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>1 – 2</td>
</tr>
<tr>
<td></td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>2 – 5</td>
</tr>
<tr>
<td></td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>5 – 10</td>
</tr>
<tr>
<td></td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>10 – 15</td>
</tr>
<tr>
<td></td>
<td>2.6%</td>
</tr>
<tr>
<td></td>
<td>15 – 20</td>
</tr>
</tbody>
</table>
## Appendix E
### Mitigation Funding

<table>
<thead>
<tr>
<th>Who is the money for</th>
<th>Hazard Mitigation Grant Program (HMGP)</th>
<th>Flood mitigation Assistance (FMA)</th>
<th>Pre-Disaster Mitigation (PDM)</th>
<th>Repetitive Flood Claims (RFC)</th>
<th>Severe Repetitive Loss (SRL)</th>
<th>Small Business Administration (SBA) Mitigation Loans</th>
<th>Increased Cost of Compliance (ICC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owners of severe repetitive loss properties currently insured under the NFIP</td>
<td>NFIP policy holders</td>
<td>NFIP policy holders</td>
<td>NFIP policy holders with at least one flood claim</td>
<td>Owners of severe repetitive loss properties currently insured by the NFIP</td>
<td>SBA Disaster Loan applicants</td>
<td>All NFIP policy holders with the ICC rider</td>
<td></td>
</tr>
<tr>
<td>Type of projects</td>
<td>(1) voluntary acquisition</td>
<td>(1) voluntary acquisition*</td>
<td>(1) voluntary acquisition*</td>
<td>(1) voluntary acquisition*</td>
<td>(1) voluntary acquisition*</td>
<td>(1) replacing previously existing mitigation measures</td>
<td>Projects that will bring a substantially damaged home into current code compliance</td>
</tr>
<tr>
<td>(2) relocation of the structure</td>
<td>(2) demolition*</td>
<td>(2) demolition*</td>
<td>(2) demolition*</td>
<td>(2) demolition*</td>
<td>(2) demolition*</td>
<td>(2) Measures deemed necessary to restore the property</td>
<td></td>
</tr>
<tr>
<td>(3) elevation</td>
<td>(3) relocation of structure*</td>
<td>(3) relocation of the structure*</td>
<td>(3) relocation of the structure*</td>
<td>(3) relocation of the structure*</td>
<td>(3) relocation of the structure*</td>
<td>Projects that will bring a substantially damaged home into current code compliance</td>
<td></td>
</tr>
<tr>
<td>(4) reconstruction</td>
<td>(4) elevation</td>
<td>(4) elevation</td>
<td>(4) elevation</td>
<td>(4) elevation</td>
<td>(4) elevation</td>
<td>Projects that will bring a substantially damaged home into current code compliance</td>
<td></td>
</tr>
<tr>
<td>(5) Constructing certain types of minor and localized flood control projects</td>
<td>(5) dry flood proofing non residential structures</td>
<td>(5) structural and non structural retrofitting</td>
<td>(5) floodproofing</td>
<td>(5) minor physical localized flood control projects</td>
<td>(5) floodproofing</td>
<td>Projects that will bring a substantially damaged home into current code compliance</td>
<td></td>
</tr>
<tr>
<td>Maximum amount available per household</td>
<td>For elevation: no maximum; for reconstruction: $150,000</td>
<td>Contact FEMA</td>
<td>Contact FEMA</td>
<td>Contact FEMA</td>
<td>Contact FEMA</td>
<td>20% of the Disaster Loan amount</td>
<td>$30,000</td>
</tr>
<tr>
<td>how much the homeowner has to pay</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
<td>0%</td>
<td>25%</td>
<td>This is a loan, it must be repaid</td>
<td>0%</td>
</tr>
<tr>
<td>How does the homeowner apply</td>
<td>Contact the County</td>
<td>Contact the County</td>
<td>Contact the State</td>
<td>Contact the State</td>
<td>Contact the State</td>
<td>Contact SBA Loan Officer</td>
<td>Contact Flood Insurance underwriter</td>
</tr>
</tbody>
</table>

*: The lot must be deed restricted as open space

**: If the project costs more than the allotted amount, then the homeowner must pay the remainder of the total project cost.