The Guidebook to Conducting Repetitive Loss Area Analyses

DRAFT REPORT

www.floodhelp.uno.edu

Supported by FEMA
Acknowledgments

The compilation of this Guidebook was managed by Erin P Merrick, CFM, and UNO-CHART Research Associate. Contributing to this report were Carrie Beth Lasley, CFM and a Doctoral Student in Urban Studies at the University of New Orleans; Solutient; French & Associates; Sherry Harper, Planning Technical Coordinator of the Insurance Services Office (ISO); and FEMA Region VI.

For more information on this Guidebook please contact:

Erin P Merrick, CFM
Research Associate, UNO-CHART
Phone: 504-280-1404
Fax: 504-280-4023
Email: ekpatton@uno.edu
Table of Contents

Section 1: Introduction to Repetitive Flood Loss ................................................................. 6
  What is a Repetitive Loss Property? .................................................................................... 6
  The National Flood Insurance Program (NFIP) ..................................................................... 7
  The Community Rating System (CRS) .................................................................................. 8
  How to use this Guidebook ................................................................................................. 8

Section 2: Working with Your Community’s Repetitive Loss List ........................................ 10
  Maintaining Data for the CRS .............................................................................................. 10
  Repetitive Loss Requirements in the CRS .......................................................................... 10
  AW-501: Repetitive Loss Updates ....................................................................................... 11
  AW-502: Repetitive Loss Requirements ............................................................................ 12
  AW-502: Category B & C Communities Repetitive Loss Requirements .............................. 12
  The National Flood Mitigation Data Collection Tool ........................................................... 13

Section 3: Determining Your Community’s Repetitive Flood Loss Problem ......................... 14
  Mapping Repetitive Loss: Area vs. Property ....................................................................... 14
  Mapping Repetitive Loss Areas .......................................................................................... 15
  Example 1: GIS Plotting ........................................................................................................ 16
  Example 2: Area known to be repetitively flooded ............................................................. 17
  Example 3: Contour map data .............................................................................................. 18
  Example 4: Site visit confirmation ....................................................................................... 19
  Example 5: Property owner interview .................................................................................. 20

Section 4: Outreach Project requirements for Category B & C Communities ....................... 21

Section 5: Mitigation Measures ............................................................................................... 27
  Levees & Floodwalls ............................................................................................................ 28
  Reservoirs & Detention ........................................................................................................ 29
  Diversion ............................................................................................................................... 30
  Drainage Improvements ...................................................................................................... 30
  Elevation ............................................................................................................................... 33
  Acquisition ............................................................................................................................ 33
  Barriers to floodwaters ........................................................................................................ 34
  Dry Floodproofing ............................................................................................................... 34
  Wet Floodproofing ............................................................................................................... 38
  Utility Protection .................................................................................................................. 38
Figure 19: Example of dredging

Figure 20: Pascagoula, Mississippi elevated home; pre- and post- Hurricane Katrina

Figure 21: Dry floodproofed home

Figure 22: A dry floodproofed home in the City of Liberty, TX

Figure 23: More from the dry floodproofed home in Liberty, TX

Figure 24: A wet floodproofed garage

Figure 25: Example of utility protection as a mitigation measure

Figure 26: UNO-CHART presenting at a neighborhood association meeting

Figure 27: An example of a residents’ data sheet

Figure 28: An example of a letter notifying residents of the RLAA

Figure 29: Some RLAA's posted on UNO-CHART’s website
Note to the reader:

This Guidebook is a DRAFT and not to be distributed until the 2012 CRS Coordinator’s Manual is published. Please submit any comments, questions, or concerns about this Guidebook and its contents to UNO-CHART by contacting:

Erin P Merrick, CFM
Research Associate, UNO-CHART
Phone: 504-280-1404
Fax: 504-280-4023
Email: ekpatton@uno.edu
Section 1: Introduction to Repetitive Flood Loss

No natural hazard is more common in the United States than flooding. Occurring in more than 20,000 American communities, floods have been the cause of more than 70 percent of all Presidential Disaster Declarations. More than 8 million residential and commercial structures are currently built in areas at risk of flooding, and floods are costly to local, state and federal governments, as well as flood victims, who must shoulder the cost of recovery.

Owners of properties that experience repetitive flooding often are locked into a cycle of damage and repair and then damage again. Many owners may not be aware of the nature of the hazard that they face, in part because they may have purchased the property or moved in after the last flood. The seller and/or the lender may not have told new purchasers that there is a flooding problem and many repetitive loss areas are not shown on flood hazard maps.

When a community has a repetitive loss problem, individuals, businesses and communities all suffer. The individuals and businesses that suffer the direct impact of flooding face a number of challenges. Individuals cleaning up the properties and living nearby also see negative effects.

What is a Repetitive Loss Property?

A Repetitive Loss property (RL) is any insurable building for which two or more claims of more than $1,000 have been paid by the NFIP during any rolling 10-year period since 1978. Claims must be at least 10 days apart but within 10 years of each other.

Repetitive Loss properties may be classified as a Severe Repetitive Loss property under certain conditions. A Severe Repetitive Loss property (SRL) has had four or more claims of at least $5,000, or at least two claims that cumulatively exceed the buildings reported value.

It is important to note here that a property does not have to be currently carrying a flood insurance policy to be considered a RL or SRL property. In fact, you will often find that homes in your community are not carrying flood insurance but are still on your repetitive loss list.

The “repetitive loss” designation follows a property from owner to owner; from insurance policy to no insurance policy, and even after the property has been mitigated! Having an insurance policy and making claims that fall into the repetitive loss criteria will put a property on the RL list, but even after the policy has lapsed or been terminated, that property will remain on your RL list. Once again, more information on your RL list and why a property remains on it will be discussed in Section 2: Working with Your Community’s Repetitive Loss List title on page 10 of this guidebook.
The National Flood Insurance Program

When a private sector insurance company is faced with high losses, it has several options: increase income (premium rates), decrease payments, or reduce the exposure to the hazard. If one of these actions is not taken, eventually the insurer will become insolvent and be forced out of business. Because the private insurance industry was reluctant to insure properties against flood losses because of the financial risk that would be required, the federal government made flood insurance available through the National Flood Insurance Program (NFIP). The NFIP has paid nearly $9 billion in claims to properties classified as repetitive-loss properties.

The NFIP does not have many of the options that are open to the private insurance industry. It can only do what is allowed by statute. Major changes in the program must be approved by Congress. If losses increase, FEMA is authorized to make incremental adjustments to increase the premium rates and reduce coverage. Coverage to high-risk properties cannot be denied or actuarial rates charged for buildings built before State and local floodplain management requirements went into effect.

When faced with claims for repetitive loss properties, the program has had no choice but to pay them and spread the costs among all policyholders. At this time, repetitive loss properties account for 15-20 percent of all future losses, however, they comprise just 1.3 percent of all flood insurance policies.

In some cases, floodplain management regulations will mitigate repetitive flood losses. If a building in the regulated floodplain is substantially damaged (i.e., the cost to repair it is 50 percent or more of the building’s value), it must be brought up to the same flood protection level as a new building. However, a large number of repetitive loss buildings are not in the regulated floodplain, and the majority of the flooded properties do not get substantially damaged.

No insurance program can survive if it does not act when so many of its expenses are caused by so few of its policyholders. Because it represents such a significant portion of the premium shortfall, NFIP actuaries report that repetitive loss is the single most important factor that impacts the soundness of the National Flood Insurance Fund (NFIF).

What the NFIP can do is reward communities and residents who take preventative measures to reduce flood losses. It does this by ensuring that those residents who have paid into protection through flood insurance can receive the maximum amount of disaster-relief resources available to them.
And communities that enforce stricter regulations and do increased community outreach can benefit by receiving a reduced rate for all policy holders in the community. The NFIP has seen success in reducing flood losses, especially in areas developed after regulations went into effect in 1978. On top of savings for disaster assistance, it is estimated that more than $1 billion of potential flood damage is avoided each year.

The Community Rating System

The Community Rating System (CRS) is a voluntary program for NFIP-participating compliant communities. It rewards communities that implement programs that exceed the minimum requirements of the NFIP by reducing premiums to residents in those communities. The CRS classifies communities into three categories. Each category of community must deal with repetitive flood problems in different ways, depending on the severity of the repetitive-loss problem.

- **Class A**: A community with no unmitigated repetitive loss properties. No special requirements from the CRS.
- **Class B**: A community with at least one, but fewer than 10, unmitigated repetitive loss properties. Class B communities are required by the CRS to research and describe their repetitive loss problem, create a map showing the location of all repetitive loss properties and complete an annual outreach activity directed to the repetitive loss addresses.
- **Class C**: A community with 10 or more unmitigated repetitive loss properties. The CRS requires Class C communities to do everything a Class B community does as well as prepare a floodplain management plan and repetitive loss area analysis for all areas.

A Repetitive Loss Area Analysis (RLAA) is a careful examination and mitigation assessment for an area with a high number of RL properties. This guidebook has been created to help you design, implement and produce RLAAAs and understand how the document can be a useful tool for your community.

How to use this Guidebook

Learning to conduct a RLAA is not only a useful skill for a community that wants to reduce local flood problems, but also a way to work with the public and other entities in finding a solution to a shared problem. Many officials can benefit with some guidance in preparing effective RLAAAs that can then serve as a valuable mitigation tool for a community. This guidebook has been created to provide that service to local officials but also to educate residents about the process and to help citizens learn more about the problems and solutions available to areas with repetitive flooding. Therefore, the goal of this Guidebook is assist local officials and the residents of repetitively flooded areas to understand all of their options in reducing their flood losses.

There is no established right way to perform an RLAA, and the needs of each community will be different. As such, this guidebook is not a technical manual, but a resource which outlines processes that others preparing RLAAAs have found to be useful and can help those just beginning an RLAA for the first

---

1 More information on the CRS can be found in Appendix A. This guidebook was written for CRS communities, but can also be used by those communities not yet in the CRS. Appendix A has information on how to join the CRS.
The most important thing to keep in mind as you begin your repetitive loss area analysis is this:

**You are not alone**

The analysis process brings together many different actors and agencies for a reason – repetitive flooding is a collective problem – it is not something that local/state officials can tackle on their own. Nor is it something that residents should have to deal with by themselves. It is only when we work together that a true impact can be made. This guidebook is here to serve as a roadmap to that ultimate goal: a reduction and/or elimination to repetitive flooding.

---

Section 2 discusses the different methods of updating and maintaining your community’s repetitive loss data. For those communities that are in the CRS, these updates and maintenance are in fact prerequisites for participation. It can also show the communities the “problem areas” with the most repetitive flood loss, and give them an idea of where to “start” with their RLAs.

Section 3 will discuss the particulars of mapping for your Repetitive Loss Area Analysis. This section will help distinguish the importance of, and difference between, repetitive loss properties (RL) and repetitive loss areas (RLA). This section lays out the steps for mapping your repetitive loss properties in order to see the larger repetitive loss picture in your community.

Section 4 will cover all you need to know in order to successfully conduct your required outreach project to your repetitive loss areas and residents. Communities that fall into Category B or C under the CRS’s guidelines will have to conduct an annual outreach project. This section covers that requirement.

Section 5 will detail the different mitigation measures that your community could use to combat its repetitive flooding issues. There is no one mitigation measure for every RL property; this section will cover the more “traditional” grant-based mitigation measures, to the more creative homeowner-initiated mitigation measures.

Section 6 brings everything you have covered in this guidebook together to assist you in completing your repetitive loss area analysis. This section go over the FEMA prescribed 5-step process for conducting a repetitive loss area analysis, as well as some “best practices” that have been discovered over the years.
Section 2: Working with Your Community’s Repetitive Loss List

For both CRS and non-CRS participating communities, maintaining repetitive loss data is important to help determine the flooding “hot spots” in the community and address problems before they are compounded. Data maintenance provides you with an opportunity to accurately identify your community’s repetitive loss issues and take the appropriate steps towards mitigating those issues. This section discusses the process of maintaining repetitive loss data and how doing so can give you and your community a step up on mitigating repetitive flooding.

Maintaining Data for the CRS

Repetitive Loss Data must be maintained and updated annually in order to participate in the CRS. During the verification visit, you will have to provide updated information about your repetitively flooded properties. Each year, ISO sends you (or your community’s CRS Coordinator; assuming you are not the coordinator) your community’s Repetitive Loss List on a CD. On this CD are a number of files, including worksheets for each RL property as well as a list of active policies and historical claims. If your community cannot locate this information, you can contact ISO at NFIPCRS@ISO.COM or by calling your ISO/CRS Specialist.

This list includes the address, dates of claims, and the name of the last claimant. This list must be updated for any community wanting to participate in the CRS or who is undergoing verification. There are two primary documents that must be filled out to demonstrate that repetitive loss data has been maintained: Activity Worksheet (AW) 501 and 502.

Repetitive Loss Requirements in the CRS

Since so many of the losses under the NFIP come from repetitively flooded properties, the CRS makes addressing these properties a priority for participating communities. Category B and C Communities that wish to participate in the CRS are required to review their repetitive loss lists and provide updated info to both ISO and FEMA. Full definitions of Category A, B, and C Communities are given in Section 1, page 8 of this guidebook. Communities will fall into one of three categories, according to the number of repetitive loss properties that you have:

- Category A has no unmitigated repetitive loss properties
- Category B has more than one and fewer than 10,
- Category C has 10 or more

Category A communities will simply need to verify that the information is accurate, while Category B and C communities will need to verify each property and update the list. Updates include:

- Checking to make sure the address is correct and that the structure still exists on the property
- Checking for mitigation activities or improvements in drainage that would reduce flood risk
- Verifying that the property is within your community’s administrative boundaries

For communities with a large number of RL properties, this can be a time-consuming task. As repetitive loss properties are mitigated against future floods or as hydrologic and development patterns shift over time, a community may change categories, and with the category change, the requirements change.
For Category C communities, an additional requirement is imposed. These communities must prepare a plan to address the problem which can be done through a floodplain management plan or a Repetitive Loss Area Analysis (RLAA). All repetitive loss properties must be addressed through these plans. Additional activities are provided for communities to address repetitive flooding problems, since it is a priority in the NFIP:

- Additional mapping in repetitive loss areas,
- Acquiring or relocating repetitive loss properties to safer grounds,
- Mitigating repetitive loss properties

**AW-501: Repetitive Loss Update**

Communities applying to the CRS or going through cycle verification must review the repetitive loss list to make sure the information provided on the list is accurate. Common examples of information that can/must be updated on the AW-501 include items such as:

- “Information provided not sufficient to identify property:” this is the update to use if the property’s address, or currently insured have been sufficiently researched without success.
- “Cosmetic changes required to the address:” this is used to correct misspelling, street suffixes, address changes such as 911 updates, or other minor edits.
- “Property not in our community or jurisdiction:” This update is for properties that are deemed to be misallocated to the incorrect community.
- “Flood Protection Provided:” This update is to be selected if either a community mitigation measure has reduced the risk of flooding or if personal property protection actions have reduced the risk of flooding to the property. If this update is selected, a Mitigation Action Code and a Mitigation Funding Code must be included. These codes tell more about the types of action and any state, federal or local assistance provided to assist residents in the action. Actions may include, but are not limited to elevation, floodproofing and drainage improvements. Please include all pertinent documentation with this update.
- “No Building on Property:” This update is selected if the property can be identified, but has been removed either due to demolition or relocation.
- “Duplicate listing with RL Number X:” This update is selected if a building has been identified twice within the data. Duplicates occur when addresses are entered incorrectly or with differing abbreviations (North 5th Street vs. N 5th St).
- “Historic Building: This update indicates that the property has been identified by the State or National Historic Registry or is eligible for this list. Supporting documentation is required.

The purpose of the AW-501 is to record each and every update to your communities repetitive loss list. For each repetitive loss property that needs to be updated for one reason or another, a separate AW-501 must be filled out and turned in to your ISO specialist. If after reviewing your repetitive loss list you see no changes or updates that need to be made, you can simply sign the transmittal sheet.
You do not need to send in more than one transmittal sheet, regardless of how many AW-501 sheets you send in to your ISO specialist. The transmittal sheet must be signed when sending in your updates – even if you are not requesting any changes be made to your community’s list.

There are many sources of data available to you to verify and update your RL list:

- Collaborate with your building and/or safety & permits division and look through building and/or demolition permits to check if the property is still standing or has filed a permit for a mitigation activity.
- Check the elevation certificates of these properties. Information provided on these certificates can assist you in verifying their location and pertinent information.
- Check for any floodproofing certificates that may be on file in your community.
- Field work is always an excellent way to verify information, and may provide opportunities for you to interact with the resident and get some inside information on their flooding history.

See the Appendix B for an example of the AW-501 and the transmittal sheet. These documents can be found on The Emergency Management Institute (EMI) Community Rating System Resource Center’s webpage at [http://training.fema.gov/EMIweb/CRS/](http://training.fema.gov/EMIweb/CRS/).

Once you have updated your RL list and submitted all necessary AW-501s and the signed transmittal sheet to your ISO specialist, it is time to complete the Activity Worksheet 502. The purpose of the AW-502 is to determine your community’s RL Category: A, B, or C.

**AW-502: Repetitive Loss Requirements**

You will recall that communities will fall into one of three categories, according to the number of repetitive loss properties that you have:

- Category A has no unmitigated repetitive loss properties
- Category B has more than one and fewer than 10,
- Category C has 10 or more

Category A communities have no other requirements as they have no RL properties. Category B communities must review and describe its repetitive loss problem, map the repetitive loss area(s), and prepare a list of the addresses in those areas, and conduct an annual outreach project to those addresses. Category C communities have to complete the same action items as Category B communities, as well as conduct a floodplain management plan (sometimes referred to as a “510” plan). These action items are discussed in the next section.

**AW-502: Category B & C Repetitive Loss Requirements**

CRS communities that fall into either Category B or C after reviewing and updating their RL lists and completing their AW-501 have some additional requirements they must follow. Category B and C communities must:

- Review and describe their repetitive loss problem
- Map the repetitive loss area(s)
- Prepare a list of the addresses in those areas
- Undertake an annual outreach project to those areas
- Category C communities must also prepare a 510/floodplain management plan.
All of these requirements – except for the 510 plan – can be handled by completing a RLAA. The requirements for completing a floodplain management plan are not discussed in this guidebook, other than the ways in which the RLAA comes into play. If you are a CRS participating community and you fall into Category C, information on conducting your floodplain management plan can be found in your CRS Coordinator’s Manual. The Manual and other helpful CRS documents can be found online at the Emergency Management Institute (EMI) Community Rating System Resource Center’s webpage at http://training.fema.gov/EMIweb/CRS/.

The next section (3) discusses how to map your community’s repetitive loss area(s), the difference and importance between repetitive loss properties vs. an area, and how to compile the address list. Section 4 will cover the CRS required outreach project for Category B and C communities. Section 5 walks you through the different mitigation measures that you may employ on your community to address repetitive flooding, and section 6 details the different mitigation methods your community may find appropriate to improve your repetitive loss problems.

**The National Flood Mitigation Data Collection Tool (NT)**

The National Flood Mitigation Data Collection Tool (National Tool or NT) is a program that allows communities to collect data on the repetitive loss properties and submit updates directly to FEMA. The National Tool is a Microsoft Access based program that communities can download from FEMA [here](http://www.fema.gov/plan/prevent/floodplain/data_tool.shtm).

Once the community has downloaded the National Tool, they will also have access to the user’s manual which walks the user through initial set up, how to enter data, and some key best practices.

The community must first obtain their repetitive loss list from FEMA in order to use the National Tool as it was intended to be used. CRS communities will have their repetitive loss data on the CDs that the ISO provides them annually. This repetitive loss list is uploaded onto the National Tool, and from there the community officials can manipulate that data to show the mitigation that has or has not taken place. Data fields in the National Tool can record information from many different sources, such as: NFIP claims information; community building, tax, and historical flood records; and field work observations.

Even if a community uses the National Tool to update their repetitive loss list, they must still complete and submit the required transmittal sheet to their ISO representative. The National Tool can be submitted in lieu of the individual AW-501 worksheets, but the signed transmittal sheet must still be sent in to the ISO specialist for your community.

---

Section 3: Determining Your Community’s Repetitive Flood Loss Problem

This section will cover the process of mapping your repetitive loss properties (RL and SRL). After updating your repetitive loss list, you should now map out all the repetitive loss properties in your community in order to get a clear picture of your repetitive flooding.

Mapping Repetitive Loss: Areas vs. Properties

The first step to conducting a RLAA is to designate the area that will be studied. It is important to understand the difference between a repetitive loss property and a repetitive loss area as both are important in distinguishing an area for analysis.

An RL property is a FEMA designation defined as an insured property that has made two or more claims of more than $1,000 in any rolling 10-year period since 1978. The term “rolling 10-year period” means that a claim of $1,000 can be made in 1991 and another claim for $2,500 in 2000; or one claim in 2001 and another in 2007, as long as both qualifying claims happen within 10 years of each other.

A property that sustains repetitive flooding may or may not be a RL property for a number of reasons:

- Not everyone is required to carry flood insurance. Structures carrying federally backed mortgages that are in a Special Flood Hazard Area (SFHA) will be required to carry flood insurance.
- Owners who have completed the terms of the mortgage or who purchased their property outright may not choose to carry flood insurance and instead bear the costs of recovery on their own.
- The owner of a flooded property that does carry flood insurance may choose not to file a claim.
- Even insured properties that are flooded regularly and file claims may not meet the $1,000 minimum threshold to be recognized as an RL property.
- The owner adopted mitigation measures that reduce the impact of flooding on the structure, removing it from the RL threat and the RL list.

For this reason, it is important when examining your repetitive flooding problem to consider an area, not a collection or even cluster of properties. You want to capture all properties that are at risk, not just the ones that have made your RL list.

Your final product in creating the borders of a Repetitive Loss Area (RLA), will include all the RL properties in the area, but will almost certainly incorporate a large number of homes that experience repetitive flooding but are not RL properties on FEMA’s list. As previously mentioned, there are numerous reasons some properties do not end up on your RL list.

Because RL properties are one way a community can identify areas of repetitive flooding, they provide an excellent place to begin when designating an RL Area for analysis. Plotting RL and Severe Repetitive Loss (SRL) properties allows you to address all properties that suffer from the same source of repetitive flooding. Providing a map of all RL and SRL areas is a requirement for all CRS-participating communities that have at least one unmitigated RL or SRL property.
It is important that documents that will be used for display to residents or other agencies abide by the Federal Privacy Act of 1974 (5 U.S.C.552a). The Privacy Act stipulates that communities may not use personal identifiers in any information that is released to the public or to any outside source. Personal identifiers include names, addresses and even 9-digit zip codes. This information is available to communities only for planning purposes so that local agencies can analyze the effectiveness of their local floodplain management activities.

However, while RL properties cannot be clearly identified on maps, RL areas can be demarcated and identified. Generic information such as total claim payments for an area may be made public. You can publish a map showing a repetitive loss area or a list of addresses in that area, provided that you do not list individual addresses or show which properties received flood insurance claims payments.

In mapping these areas, the addresses and identifying characteristics of the individual properties must be obscured because of the Privacy Act, but the areas should include all RL and SRL properties within their boundaries. Examining the clusters of properties can prove beneficial to selecting a meaningful RLA and accounting for outliers assures maximum credit points if you are in a CRS participating community.

**Mapping Repetitive Loss Areas**

In some cases, the building on the list will be the only structure exposed to repetitive flooding. However, in most cases there will be other properties in the repetitive loss area besides those on FEMA’s list. The important thing is to check out the neighborhood and make sure that all appropriate properties are included. Here is a simple step-by-step guidance:

1. Plot the updated list of repetitive loss properties on a map. The properties are listed in the AW-501 file and a spreadsheet (Microsoft Excel) file provided on your CD.

2. Plot nearby properties that have received one flood insurance claim. These are listed in the “historical claims” Excel file. This will show other properties with a history of flooding. Double-check the dates of the flooding (“Date of loss”) to see if they coincide with the dates for the properties on the repetitive loss list.

3. If you have the capability, overlay a topographic map or geographic information system (GIS) layer to identify areas that are obviously lower in elevation than areas without repetitive claims.

4. Draw lines around those areas with similarly situated properties, i.e., subject to flooding and lower-lying than the surrounding properties.

5. Check the area in the field to confirm the boundaries. If the mapping doesn’t make sense, it may be that the repetitive loss buildings are unique. For example, they may be the only buildings in the neighborhood on slab foundations, so they are lower than the others. See example 3, below.

6. In every case, a visit to the site helps confirm that the boundary makes sense. See example 4, below.

7. If these “remote” ways to determine the repetitive loss area boundary don’t explain why an area is flooded repeatedly, you should contact the property owners. See example 5, below.
8. If you conclude that there is only one building in a repetitive loss area, be sure to document the reasons for your conclusion.

9. If you have a lot of repetitive loss properties spread throughout your community or floodplain, you can declare your entire community or floodplain to be a repetitive loss area.

10. After the repetitive loss areas are identified, you must prepare a list of the addresses of all improved parcels in those areas. An improved parcel is one with an **insurable building** on it. For CRS purposes, an insurable building is a walled and roofed structure, principally above ground and affixed to a permanent site, including a manufactured (mobile) home on a foundation. When in doubt, refer to Section 301 of the *Coordinator’s Manual*.

**Example 1: GIS Plotting**

The University of New Orleans, Center for Hazards Assessment, Response, and Technology (CHART) conducted a repetitive loss area analysis in La Porte, Texas. These services allowed La Porte, Texas, to plot its repetitive loss and “severe” repetitive loss properties and determine appropriate boundaries for its repetitive loss areas.

The green map shows the repetitive loss properties in blue and the severe repetitive losses in red. The plotting shows one large concentration of properties south of Spencer Highway, along two drainage canals.

With the GIS, addresses from FEMA’s list are plotted on individual parcels. This is not shown here because that information is protected by the Privacy Act. The lower map shows the parcels and the A Zones and shaded X Zones from the Harris County Digital Flood Insurance Rate Map (DFIRM).

At this stage, the boundary of a repetitive loss area can usually be drawn. In this example, the northern and eastern boundaries are the edge of the residential subdivision. The large blue A Zone to the east is not included because it is vacant power line right-of-way. The western boundary roughly coincides with the boundary of the X Zone (shaded brown). A site visit found that the subdivision to the south of the streets with all the red dots is newer.
It was built a little higher than the repetitively flooded area. There is a noticeable rise in the street as one drives south.

Maps like these two can be published without violating the Privacy Act. The top one shows repetitive loss properties, but the scale is such that the dots cannot be matched to specific addresses. The lower one shows all the parcels in the designated area, but does not identify which ones have had flood insurance claims. This repetitive loss area has 51 repetitive loss properties, 31 of them qualifying as severe repetitive losses. The address list for this repetitive loss area has a total of 198 properties.

Example 2: Area known to be Repetitively Flooded

The Richardson Subdivision is in unincorporated Kane County, Illinois, along the Fox River. It has 27 single-family homes, 24 of them constructed before floodplain management regulations took effect. As seen in the aerial map below, it is in a position that is “asking for trouble.” The entire subdivision is in the floodway. It has a history of yard flooding in the spring and during ice jams on the Fox. Only one property in the subdivision is on FEMA’s repetitive loss list. Two others have received one flood insurance claim each. Instead of trying to isolate a small area based on the claims history, the County opted to include the entire subdivision as an official repetitive loss area.

Figure 5: An area known to be repetitively flooded
Example 3: Contour Map Data

The parcel at 211 North River also lies along the Fox River. The riverfront land to the north is open space, owned by a park district. To the south are a parking lot and several commercial properties that are closer to North River Street and on higher ground. The community shot the elevation of the lowest grade adjacent to the building at 211 North River. It is 613.1 feet above sea level. The GIS topographic map below shows the 100-year floodplain (in red) and contour lines (in green). All other buildings in the area are above the 618-foot contour line and they have no history of flood insurance claims. Based on this information the community determined that 211 North River Street is a single property repetitive loss area.

Figure 6: Example of a contour map overlay to determine cause of repetitive flooding
Example 4: Site Visit Confirmation

The City of Des Plaines, Illinois, plotted one repetitive loss property on the river at the end of Campbell Avenue. It was flooded by the Des Plaines River in 1986 and 1987. A Google Earth® air photo shows that there are many properties on Campbell Avenue.

A check of the historical file identified only one other property on Campbell Avenue with a flood insurance claim. It was flooded in 1987. Although the water was higher in the first flood, it is suspected that the property was uninsured in 1986. Seeing what the river can do, the owner bought a policy and was covered when the 1987 flood arrived.

A site visit found three similar homes at the end of Campbell—all three houses are elevated over garages and enclosed first floors. Other homes on the street are elevated on fill or are otherwise constructed above the flood level.

The City determined that all three homes are similarly situated. This repetitive loss area is composed of 1769, 1785, and 1799 Campbell Avenue. The map and the list of addresses can be publicized, but the Privacy Act prevents releasing which home received flood insurance claim payments.

Example 5: Property Owner Interview

This repetitive loss property is located in the X Zone, well away from any flood problem known to the County. The topographic map to the right was prepared by the County’s GIS office. It has two-foot contour intervals. The arrows show the direction of surface flows. The land to the east and southeast is higher and naturally drains to the property. The County visited the site, took some photos, and talked to the owner. The owner noted that some years earlier, the owner of the property to the east, across the street, filled his yard, including the drainage swale along the street.
This reduced the area that stored surface runoff, but the lot still drains toward the repetitive loss property. The land to the east drains to an 18-inch pipe that runs under the street. Its location is shown by the blue arrow in the map. The pipe empties into the southeast corner of the repetitive loss lot. It has been well maintained, so water readily drains into the front yard of the site. Water has been known to cover half the front yard until it can drain to the west. The low parts of the property in question are the north and south property lines. Surface runoff flows toward the house from the north, east, and south, around the house and on to the west, primarily around the south side of the property.

The ground on the property to the south is higher (see photo). The houses to the north and south were built in 1962 and 1963 while the repetitive loss home was built later, in 1969. Apparently it was one of the last lots on the street to be built on, possibly because it is lower than the rest.

As seen on the topographic map, the ground is flat, so the water does not drain from the front yard very quickly. Flow is also slowed down by a fence and plantings along the property line. Eventually the front and side yards drain and the water flow downhill to the west. Based on the topographic data, the interview with the owner, and the lack of other flood insurance claims in the area, the County concluded that this property constitutes a single-parcel repetitive loss area.

---

**Figure 10:** Topographic map of RL in an X Zone

**Figure 11:** Higher ground between homes
Section 4: The Outreach Project for Category B and C Communities

Communities with repetitive loss properties must also conduct outreach projects to residents in those repetitive loss areas. The RL properties must be mapped and RL areas must be designated. This outreach project must:

- Inform residents in the RL area that they are in an area subject to flooding,
- Identify mitigation activities appropriate for residents,
- Share basic information about the availability of flood insurance.

A copy of the outreach project should be included in the documentation you or your community’s CRS Coordinator hands over to your CRS Specialist during verification visits. The following was taken from the CRS Coordinator’s Manual, Section 503:

In its CRS application, a community with one or more properties on the updated FEMA list (i.e., a category B or C community) must submit AW-502 and:

a. A description of the cause(s) of the repetitive flooding;

b. A map of its repetitive loss areas. The repetitive loss areas must include the properties on the repetitive loss list obtained from FEMA and all adjacent properties with the same or similar flooding conditions;

c. A list of the addresses of all the properties in the repetitive loss area(s) with insurable buildings on them; and

d. The number of buildings in the repetitive loss area(s), bRLA

You should already have your map of your repetitive loss area(s) and the address list(s) to accompany the map(s). Coming up with the bRLA from those two sources of data should be little effort, though a visit to the field to verify that information is always recommended. If you have yet to define and map your repetitive loss area(s) or develop the address list(s) for your RLA(s), now is the time to do so. See Sections 2 and 3 of this Guidebook for directions.

The CRS Coordinator’s Manual tells us that once you have the area(s) mapped and the corresponding address list(s) made, it is time to carry out the required outreach project. We will now cover the CRS requirements for both Category B and C communities – but not the floodplain management plan requirement for Category C communities.

---

3 See Section 1 page 4, or Section 2 page 12 for definitions and discussions of Category A, B, and C Communities
4 Section 6, page XX of this Guidebook covers the basics of fieldwork. See also Appendix C for detailed information on conducting fieldwork.
According to the *CRS Coordinator’s Manual*:

**e.** A category B or C community must implement an annual outreach project to the properties in the mapped repetitive loss areas and include a copy of the project with its application.

1. The outreach project must advise the recipient of four things:
   
   (a) that the property is in or near an area subject to flooding;
   
   (b) property protection measures appropriate for the flood situation;
   
   (c) sources of financial assistance for property protection measures; and
   
   (d) basic facts about flood insurance.

2. The outreach project must be delivered to all properties in the repetitive loss AREAS not just the properties on the FEMA list. This may be done in one of three ways:

   (a) An outreach project that is distributed each year and that reaches the properties in the repetitive loss areas. This project may also be submitted for credit as an outreach project to floodplain properties (OPF) or an additional outreach project (OPA) under Activity 330;

   (b) An outreach project pursuant to the public information strategy (OPS) credited in Activity 330, provided that the public information strategy identifies the target audience and discusses the best way to advise that audience about the hazard, property protection, available financial assistance, and flood insurance; or

   (c) An outreach project that does the same as (a) or (b) above, but it not credited under Activity 330. The materials must be distributed each year.

**f.** A category B or C community must include a copy of each year’s outreach project with its annual recertification.

In the next few pages, we will cover the example of the required outreach project from the *Coordinator’s Manual*. The City of Floodville has just received their repetitive loss list and is about to produce a map that shows all the RL and SRL properties, as well as the distinguished repetitive loss areas.

It appears that Floodville simply mapped their RL properties on a copy of their FIRM, which is an excellent way of being able to see the different flood zones and how they might be contributing to your RL issues. In this case, the FIRM Zone for at least one of Floodville’s RLAs appears to be causal to its repetitive flooding. As you will see, RLA #1 is in an A-15 Zone, which can be a leading cause of its repetitive flooding, where as RLA #2 which is situated in a C Zone.

See the map on the following page for Floodville’s final mapped RLAs.

---

5 This information was taken directly from the CRS Coordinator’s Manual; Section 503
Note that the Privacy Act is mentioned on this map. Though fictitious, Floodville knows that they are dealing with privileged information (flood insurance claims data, claims amounts, etc.) and wants to make sure their employees are aware of the sensitive nature of this data.
You do not have to map your RLA(s) in the same manner that Floodville has done; though it is not a bad idea, as doing so will help you keep your RL and non-RL properties properly identified. This next example is of the letter – the actual outreach – that Floodville sent to RLA #2.

City of Floodville
City Hall
Floodville, ST 98765

Resident
3801 Adams St.
Floodville, ST 98765

Dear Resident:

You have received this letter because your property is in an area that has been flooded several times. When our drainage system of ditches and culverts was built over 50 years ago, it could handle all but the largest storms. Since then, urban development in and upstream of Floodville has increased the amount of stormwater runoff. Now, heavy rains overload the system more often. As a result, your area floods on an average of every 3–4 years.

The City of Floodville is concerned about repetitive flooding and has an active program to help you protect yourself and your property from future flooding. We are seeking funding support to construct reservoirs upstream of your area and to make improvements that will increase the downstream floodwater carrying capacity.

Meanwhile, here are some things you can do:

1. Check with the Building Department (555-1234) on the extent of past flooding in your area. Department staff can tell you about the causes of repetitive flooding, what the City is doing about it, and what would be an appropriate flood protection level. City staff can visit your property to discuss flood protection alternatives.

2. Prepare for flooding by doing the following:
   - Know the flood safety guidance on the last page of this letter.
   - Know how to shut off the electricity and gas to your house when a flood comes.
   - Make a list of emergency numbers and identify a safe place to go to.
   - Make a household inventory, especially of basement contents.
   - Put insurance policies, valuable papers, medicine, etc. in a safe place.
   - Collect and put cleaning supplies, camera, waterproof boots, etc., in a handy place.
   - Develop a disaster response plan – See the Red Cross' website: www.redcross.org/services/disaster/ for a copy of the brochure “Your Family Disaster Plan”
   - Get a copy of Repairing Your Flooded Home. We have copies at the Public Works Department or it can be found on the Red Cross' website, too.

Figure 500-3a. Outreach project to Floodville’s repetitive loss area #2.

Because Floodville’s two repetitive loss areas have such different types of flooding, the City sends different mailings to each. This one includes property protection and financial assistance information appropriate for area #2’s shallow flooding.

The beginning of the letter mentions that the recipient is receiving this letter because their property is in an area that is known to flood. It also describes the cause of the repetitive flooding, and offers ways that the resident can protect their property from flooding, and as you will see below on the second
As long as Floodville documents this outreach project by providing their CRS Specialist with all of these documents and other necessary information (maps of the area(s) and the bRLA), they have completed information on mitigation funding opportunities and flood insurance.

3. Consider some permanent flood protection measures.
   - Mark your fuse or breaker box to show the circuits to the floodable areas. Turning off the power to the basement can reduce property damage and save lives.
   - Consider elevating your house above flood levels. This was done on St. Mary's Road near 40th Street. In 1998, the Foster Creek flood went under these houses without damaging them.
   - Check your building for water entry points. These can be basement windows, the basement stairwell, doors, and dryer vents. These can be protected with low walls or temporary shields.
   - Install a floor drain plug, standpipe, overhead sewer, or sewer backup valve to prevent sewer backup flooding.
   - More information can be found in Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding. Copies are in the Floodville Public Library or at www.fema.gov/hazards/floods/lib312.shtml.
   - Note that some flood protection measures may need a building permit and others may not be safe for your type of building, so be sure to talk to the Building Department.

5. Talk to the Building Department for information on financial assistance.
   - The City administers a flood protection rebate program that will pay 25% or approved projects, up to a total of $2,500. This program has funded low floodwalls, overhead sewers, sewer backup valves, and relocation of utilities to higher levels.
   - If you are interested in elevating your building above the flood level or selling it to the City, we may apply for a Federal grant to cover 75% of the cost.
   - Get a flood insurance policy — it will help pay for repairs after a flood and, in some cases, it will help pay the costs of elevating a substantially damaged building.

6. Get a flood insurance policy.
   - Homeowner’s insurance policies do not cover damage from floods. However, because Floodville participates in the National Flood Insurance Program, you can purchase a separate flood insurance policy. This insurance is backed by the Federal government and is available to everyone, even properties that have been flooded. Because Floodville participates in the Community Rating System, you will receive a reduction in the insurance premium.
   - Because your area is not mapped as a Special Flood Hazard Area, you may qualify for a lower-cost Preferred Risk Policy.
   - Some people have purchased flood insurance because it was required by the bank when they got a mortgage or home improvement loan. Usually these policies just cover the building’s structure and not the contents. During the kind of flooding that happens in your area, there is usually more damage to the furniture and contents than there is to the structure. Be sure you have contents coverage.
   - Don’t wait for the next flood to buy insurance protection. In most cases, there is a 30-day waiting period before National Flood Insurance Program coverage takes effect.
   - Contact your insurance agent for more information on rates and coverage.

Figure 500-3b. Page two of Floodville’s outreach project to its repetitive loss area #2.
their repetitive loss outreach requirements. More real-life examples of outreach projects that have been submitted for CRS credit are included in Appendix D of this Guidebook.

The more successful outreach projects come about when the community involves the residents in the repetitive loss area in the process. The point of an outreach project is to inform and educate the residents of what is going on in regards to flooding in their area; but some communities choose to go a step further by soliciting active participation from the residents in the area.

While mailing a letter informing residents and business owners in the area of the flooding problem is minimally suitable for an outreach project, incorporating residents into the outreach project can provide valuable information to officials and residents alike. It is the people who are in the structures that can provide the best information about when the area floods and what the nature of the flooding is. Residents often understand the source of the flooding as well. Attending community meetings to let residents know about upcoming fieldwork for repetitive loss data maintenance, or outreach projects/meetings may lead to a more meaningful conversation about the nature of the problem and what solutions may exist.

Residents may be willing to assist with field work, data maintenance, and outreach projects providing officials with better access to problem areas and a more nuanced understanding of local flooding problems. Additionally, sharing findings with residents may increase the number of mitigation activities adopted in the area and can encourage residents to lobby politically for drainage improvements that will improve flooding conditions.

It has always been the practice of UNO-CHART to present the draft of the area analysis at to the residents and other stakeholders. By doing so, you will be giving everyone involved a chance to voice their questions or concerns, and in the end your area analysis will be more robust – and likely – have more impact. If the stakeholders feel like this is something that they have put their time and effort into, they will be more likely to follow through with the recommendations that you put forth.
Section 5: Mitigation Measures

The part of the RLAA process that requires the most analysis is matching up the appropriate mitigation measures to the types and causes of flooding. There are a number of mitigation measures to consider, and in this chapter we will talk more about the alternatives and where they may be most appropriate. Then we will discuss the available financial support programs that your residents may have access to and what some of the requirements of these programs are. This discussion is not designed to be comprehensive, as mitigation measures and programs will vary by location and sometimes over time.

Mitigation Measures

More than determining the cause and severity of the repetitive flooding problem, the RLAA should investigate realistic solutions to reducing future losses to repetitive flooding. A wide range of mitigation activities may be available to residents. Additionally, financial assistance in the form of grants may be available to residents. However, not all residents will qualify for all available grant opportunities, and not all mitigation measures can or should be applied to all structures experiencing repetitive flooding. The flood crests, duration, depth of flooding, and frequency will dictate appropriate mitigation measures.

There are two types of mitigation consider when drafting your RLAA — structural and non-structural.

Flood control projects have traditionally been used by communities to control or manage floodwaters. They are also known as “structural” projects that keep flood waters away from an area as opposed to “non-structural” projects, like retrofitting, that do not rely on structures to control flows.

Structural mitigation methods are typically collective efforts taken on by local and/or federal agencies. These are infrastructural investments designed and built by engineers. In some cases, advocating for such projects make sense to solving long-term repetitive flooding problems. Below are examples of structural mitigation measures that we have encountered as we conducted RLAAs:

- Levees and Floodwalls
- Reservoirs and Detention
- Diversions
- Drainage Improvements
  - Storm sewers
  - Channel Improvements
    - Dredging
  - Street crossings, roadways & culverts improvements

These structural projects have three advantages that you will not see from other mitigation measures:

- They can stop most of the flooding, protecting streets and landscaping as well as buildings
- Many projects can be completed without disrupting residents homes and/or businesses
- These projects are constructed and maintained by a government agency which is a more dependable long-term management arrangement than depending on individual private residents.

There are downsides to structural projects, as there are with most mitigation measures. These “cons” include things such as the fact that land, natural water flows, and wildlife habitats are often disturbed or destroyed; neglected maintenance can lead to disastrous consequences; a false sense of security can be created; and the unintended promotion of intensive land use and development in the fragile floodplain.
Levees and Floodwalls

One of the better known and widely recognized structural flood control measure. A barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour.

Key considerations when evaluating use of a levee include:

- Design and permitting costs,
- Right of way acquisition,
- Removal of fill to compensate for the floodwater storage that will be displaced by the levee,
- Internal drainage of surface flows from the area inside the levee,
- Cost of construction,
- Cost of maintenance,
- Mitigation of adverse impacts to wetlands, etc.,
- Loss of river access and views, and
- Creating a false sense of security (while levees may reduce flood damage for smaller more frequent rain events, they may also overtop or breach in extreme flood events and subsequently create more flood damage than would have occurred without the levee).

Levees placed along the river or stream edge degrade the aquatic habitat and water quality of the stream. They also are more likely to push floodwater onto other properties upstream or downstream. To reduce environmental impacts and provide multiple use benefits a setback levee is the best project design. The area inside a setback levee can provide open space for recreational purposes and provide access sites to the river or stream.

Floodwalls perform like levees except they are vertical-sided structures that require less surface area for construction. Floodwalls are constructed of steel sheet pile or reinforced concrete, which makes the expense of installation cost prohibitive in many circumstances. Floodwalls also degrade adjacent habitat and can displace erosive energy to unprotected areas of shoreline downstream.

Seawalls are barriers or retaining walls that are built facing a large lake, ocean or the Gulf. They are intended to protect the land from erosion by wave action. However, they often have an adverse impact on the shore and on neighboring properties and the movement of sand. The natural forces that transport sand and replenish beaches are disrupted by the wall, often increasing shoreline erosion on adjacent properties. Therefore, they are not encouraged and are even prohibited in many areas.
Reservoirs and Detention

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it can flow downstream. Flood waters are detained until the flood has subsided, then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could help mitigate a drought).

Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins are built to protect property from the impacts of new development (i.e., more runoff).

Regardless of size, reservoirs protect the development that is downstream from the reservoir site. Unlike levees and channel modifications, they do not have to be built close to or disrupt the area to be protected. Reservoirs are most efficient in deeper valleys where there is more room to store water, or on smaller rivers where there is less water to store.

In urban areas, some reservoirs are simply manmade holes, excavated to store floodwaters (see top photo). Reservoirs in urban areas are typically constructed adjacent to streams (though usually outside of the floodplain). When built in the ground, there is no dam for these retention and detention basins and no dam failure hazard. Wet or dry basins can also serve multiple uses by doubling as parks or other open space uses.

There are several considerations when evaluating use of reservoirs and detention:

- There is the threat of flooding the protected area should the reservoir’s dam fail,
- There is a constant expense for management and maintenance of the facility,
- They may fail to prevent floods that exceed their design levels,
- Sediment deposition may occur and reduce the storage capacity over time,
- They can impact water quality as they are known to affect temperature, dissolved oxygen and nitrogen, and nutrients, and
- If not designed correctly, in-stream reservoirs may cause backwater flooding problems upstream.

Figure 14: Urban detention basin

Figure 15: The Whisper Wood area will be protected from flooding by this reservoir
**Diversion**

A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During flood flows, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Diversions are limited by topography; they will not work in some areas. Unless the receiving water body is relatively close to the floodprone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive.

**Drainage Improvements**

This structural flood control measure involves any changes and/or updates to your current stormwater drainage system in order to improve its drainage capacity.

This can include things such as:

- Storm sewers
- Channel improvements
  - Dredging of channels
- Street crossing, roadways and/or culvert improvements

**Storm sewers** improvements include installing new sewers, enlarging small pipes, and preventing backflows. The advantage of converting an open channel to a storm sewer is that it creates more usable ground surface. It also reduces maintenance problems, because it is harder for debris to get in the pipes and clog the flow of water.

From a flood protection perspective, piping ditches and installing storm sewers has some problems.

- The biggest problem is that a pipe is only so large. What happens to the 10-year storm when a pipe is only designed to carry the 5-year flow?
- Pipe openings and storm sewer inlets need to be kept cleaned in order for the water to get into the pipes.
- It’s an expensive approach, although it can save maintenance costs in the long run and reduce the potential for accidents or injuries if someone is hurt in an open channel.

Converting an open channel to a storm sewer should only be done if there are arrangements for handling the overflow, either through a swale over the pipe or through streets.

Channel Improvements means straightening, deepening and/or widening a ditch or drainage-way to remedy local drainage or flooding problems. There are the concerns with this approach that need to be kept in mind:

- Channelized streams can create or worsen flooding problems downstream as larger volumes of water are transported at a faster rate.
Channelized streams rise and fall faster. During dry periods the water level in the channel is lower than it should be, which creates water quality problems and degrades habitat.

Channelized waterways tend to be unstable and experience more stream bank erosion. The need for periodic reconstruction and silt removal becomes cyclic, making channel maintenance very expensive.

On the other hand, properly sloped and planted channel banks are more aesthetically and environmentally appealing, and can prove cheaper to maintain than concrete ditches. A combination of restored wetland detention, vegetated swales, infiltration trenches and other best management practices that increase infiltration (reducing runoff), and improve water quality can be implemented in conjunction with stormwater system improvements. As shown in the photos below, these projects can have multiple benefits.

Dredging of channels/canals/waterways is often viewed as a form of transportation improvement. There are a few shortcomings associated with dredging:

- Given the large volume of water that comes downstream during a flood, removing a foot or two from the bottom of the channel will have little effect on flood heights.
- Dredging is often cost prohibitive because the dredged material must be disposed of somewhere.
- Unless instream and/or tributary erosion are corrected upstream, the dredged areas usually fill back in within a few years, and the process and expense have to be repeated.
- If the channel has not been disturbed for many years, dredging will destroy the habitat that has developed.
To protect the natural values of the stream, Federal law requires a Corps of Engineers permit before dredging can proceed. This can be a lengthy process that requires much advance planning and many safeguards to protect habitat (and adds to the cost of the project).

Street crossings, roadways, and/or culvert improvements refer to the improvements that can be made to existing structural elements in order to improve the ability of water to flow through an area unrestricted.

Street crossings and roadways can exacerbate flooding issues in an area, specifically when the roadways are suffering from crowning (when the center buckles up, forming a peak in the center of the street) or being elevated above the homes. If the roadway is higher than the surrounding homes, water will back up into the yards and could possibly flood the area.

If a culvert in a waterway is undersized, it can lead to water being “kept in” the channel and result in flooding of the surrounding area(s). Undersized culverts are common issues around bridges and train tracks that cross streams or other bodies of water, especially if that body of water has seen increased development on its banks over the years. The more development, the more runoff, and the more undersized culverts become a flooding hazard.

Non-structural mitigation measures are mitigation measures that can be taken on at the resident level. There are some funding mechanisms in place to assist in the cost of these measures, and these will be discussed at the end of this section.

Although analysis will help you determine what options are best for your RLA, below is a list of common mitigation methods that UNO-CHART has recommended over the years. Examples of each are discussed as well:

- Elevation
- Acquisition
- Barriers to floodwaters
- Dry Floodproofing
- Wet floodproofing
- Utility Improvements
- Maintaining Flood Insurance

The following sections will cover the basics of each of these mitigation measures. If you are interested in learning more, or need more information to put into your community’s RLA, please visit UNO-CHART’s website: www.floodhelp.uno.edu and look at one of our RLAAs for examples. You may pull directly from those reports and use that information in your community’s RLA.
**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 be elevated on fill, posts/piles, or a crawlspace.

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 or crawlspace because it is easiest to get lifting equipment under the floor and disruption to the habitable part of the house is minimal. Elevating a slab house is much more costly and disruptive. 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 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 elevating a slab foundation, 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 (ICC) funds, which is discussed later in this section on page 40.

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.

**Acquisition:** This measure involves buying one or more properties and clearing the site. If there is no building subject to flooding, there is no flood damage. Acquisitions are usually recommended where the flood hazard is so great or so frequent that it is not safe to leave the structure on the site. An alternative to buying and clearing the whole subdivision is buying out individual, “worst case,” structures with FEMA funds.

This approach would involve purchasing and clearing the lowest or the most severe repeatedly flooded homes. If FEMA funds are to be used, three requirements will apply:

1. The applicant for FEMA must demonstrate that the benefits exceed the costs, using FEMA’s benefit/cost software.
2. The owner must be a willing seller.
3. The parcel must be deeded to a public agency that agrees to maintain the lot and keep it forever as open space.

Due to the high cost and difficulty to obtain a favorable benefit-cost ratio in shallow flooding areas, acquisitions are reserved for the worst case buildings. Not everyone wants to sell their home, so a checkerboard pattern of vacant and occupied lots often remains after a buyout project, leaving “holes” in the neighborhood. There is no reduction in expenses to maintain the neighborhood’s infrastructure for the community, although the tax base is reduced. The vacant lots must be maintained by the new owner agency, and additional expense is added to the community. If the lot is only minimally maintained, its presence may reduce the property values of the remaining houses.

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 of the homes in the Oak Forest study area. Homes that typically receive three feet of floodwater or less, or where the water does not stay up for a considerable amount of time, can benefit from small floodwalls, levees or berms. It is imperative to test the soils type at any location when considering constructing a barrier to floodwaters.

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 door in the photo in Figure 11 on page 24. 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 (see Figure 21 on the next page).
- Power to operate the sump pump around the clock during a storm.

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.

Dry Floodproofing: This measure keeps floodwaters out of a building by modifying the structure. 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, such as removable shields or sandbags, for the openings; including doors, windows, dryer vents and weep holes;
- Account for sewer backup and other sources of water entering the building. For shallow flood levels, this can be done with a floor drain plug or standpipe; although a valve system is more secure.

As seen in Figure 21 below, 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.

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.

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.

As with floodwalls, floodproofing is appropriate where flood depths are shallow and are of relatively short duration. It can also be more attractive than a floodwall around a house. The example below was found in Liberty, Texas during the fieldwork for a RLAA that UNO-CHART conducted in 2010.
This one story slab-on-grade house was built in the 1950s. In 1961 it was flooded due to heavy rains from Hurricane Carla. The site is currently in an X Zone, but the owner expected flooding to reoccur, which it has in this repetitive loss neighborhood. The owner at that time was a contractor. He installed a concrete apron around the house. It is roughly 3 inches thick and 12 inches high. The project is explained in the photos, below.

The house has withstood numerous shallow floods over the last 49 years. However, it was been flooded twice since 1961. In 1994, a levee was overtopped and the area flooded higher than the top of the apron. In 2000, cracks at the joints leaked. The current owner is a widow who has not been able to seal the cracks.
<table>
<thead>
<tr>
<th>Figure 23: More examples from the dry floodproofed home in the City of Liberty, Texas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>This is the back side of the cover for the entranceway opening. It is stored around the corner in the garage. It has two rows of foam rubber to seal the board to the concrete posts and floor.</strong></td>
</tr>
<tr>
<td><strong>The cover is installed over the concrete posts at the entranceway. The bolts are screwed tight with wing nuts. The board must be over 40 years old, but fit like a glove over the bolts.</strong></td>
</tr>
<tr>
<td><strong>In the garage, the washing machine and water heater are on an 18&quot; concrete pedestal.</strong></td>
</tr>
<tr>
<td><strong>The door from the garage to the house has the same concrete post and wooden shield arrangement as the front entranceway.</strong></td>
</tr>
<tr>
<td><strong>The back patio has a block wall around it. The door to the yard is raised one level of block. To go outdoors, one has to step over the block wall.</strong></td>
</tr>
<tr>
<td><strong>Note that the landscaping conceals the concrete apron.</strong></td>
</tr>
</tbody>
</table>
Wet Floodproofing: This approach to flood mitigation is appropriate for garages and raised basement homes. The wet floodproofing approach allows water to enter the building. However, everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace and water heater are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

Wet floodproofing has one advantage over the other approaches: no matter how little is done, flood damage is reduced. Thousands of dollars in damage can be prevented by simply moving furniture and electrical appliances upstairs. The major disadvantage of wet floodproofing is that the owner loses the use of the living space below the flood protection level. While the area can still be used, there should be no carpeting, furniture, insulation, and other materials subject to water damage that cannot be removed in time. This may not be a problem where the basement homes have flooded before and the owners have opted to not refinish them.

Information specific to raised basement homes: It is possible that a wet floodproofed raised basement home could be considered an elevated building under the floodplain building requirements. In other words, rather than physically elevating the structure to the BFE, by converting the first floor (the “basement”) to a wet floodproofed area, the old second floor (only if it is at or above the BFE) could be considered the new lowest floor for code purposes. Elevating the lowest floor of living space above BFE is only required for those houses that are substantially damaged. Such an interpretation would greatly reduce the cost to the homeowner of meeting the code requirement for repairing a substantially damaged house. However, the owner would lose the use of the first floor as a finished living area or rental unit. The floodplain regulations require that the floodable area be used only for parking, access, and storage and any finished structural parts (such as wallboard) and the contents located below the first floor are not insurable.

Utility Improvements: This measure applies to several different utilities that can be adversely affected by floodwaters such as:

- Heating, Ventilation, and Air Conditioning (HVAC) systems
- Fuel meters and pipes
- Electrical service boxes, wiring and fixtures
- Sewage systems
- Water systems

Damage to utilities can prevent a residence that remains structurally sound after a flood from being reoccupied. Retrofitting utilities includes things as simple as raising them above the flood level and building small walls around furnaces and water heaters to protect from shallow flooding.
FEMA document 348: Protecting Building Utilities from Flood Damage covers various ways to protect utilities; whether the building is a new construction, declared substantially damaged, or simply an existing structure in need of retrofitting, this document covers different techniques used in protecting utilities.

The cost for protecting utilities varies and is dependent upon the measure itself, condition of the system, structure, and foundation. A lot of the measures can be performed by the homeowners themselves, although it is always a good idea to consult a professional contractor and/or engineer (depending on the project). The costs can be lower when done as part of a repair or remodeling project. Interested homeowners should examine their flooding history and decide if utility protection is an appropriate measure for their building.

Maintaining 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. There are eight flood events listed in Table 3, but only one of them was severe enough to qualify for disaster assistance (Hurricane Ike).
Once in effect there is no need for human intervention\textsuperscript{6}. 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.

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 Special Flood Hazard Areas (SFHA) because the X zone indicates a lower risk from flooding.

A building that is located in the A flood zone and constructed or substantially improved after the date of the most current FIRM for your community - such as one built or substantially improved in 2010 – is required to be built above the base flood elevation 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.

\textbf{Funding Sources}

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 \textbf{substantial or repetitive damage determination} made by the local floodplain administrator.

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 \textbf{must have been in effect} during the flood
- A substantial or repetitive damage determination must have been made by the local floodplain administrator
- 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 Special Flood Hazard Area (SFHA) Zone, such as A, AE, V, and VE Zones. Currently, the Oak Forest neighborhood is not in the SFHA, so an amendment to the City’s floodplain management ordinance would be needed.

\textsuperscript{6} There is a 30-day waiting period for a new flood insurance policy before it goes into effect.
There are also some FEMA grants that are available for funding different mitigation measures. The table below gives an overview of those programs.

<table>
<thead>
<tr>
<th>Types of Projects Funded</th>
<th>HMGP</th>
<th>FMA</th>
<th>PDM</th>
<th>RFC</th>
<th>SRL</th>
<th>ICC</th>
<th>SBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition of the entire property by a gov’t agency</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Relocation of the building to a flood free site</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Demolition of the structure</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Elevation of the structure above flood levels</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Replacing the old building with a new elevated one</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Local drainage and small flood control projects</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Dry floodproofing (nonresidential or historic buildings)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Percent paid by Federal program</td>
<td>75%</td>
<td>75%</td>
<td>75%</td>
<td>100%</td>
<td>75%</td>
<td>100%</td>
<td>0</td>
</tr>
</tbody>
</table>

More information can be found online on FEMA’s website [www.fema.gov](http://www.fema.gov) and searching for flood hazard mitigation funding. You can also review the University of New Orleans’ Center for Hazards Assessment, Response and Technology (UNO-CHART) completed repetitive loss area analyses on their website: [www.floodhelp.uno.edu](http://www.floodhelp.uno.edu). In depth information on mitigation actions and funding sources can be found in those analyses, and that information can be pulled and used in your area analysis.
Section 6: Repetitive Loss Area Analysis

At this point in the RLAA process, you have:

- Reviewed and updated your RL list
- Submitted updates where necessary
- Determined your community’s RL Category (A, B, or C)
- Plotted your community’s RL properties and historical claims
- Determined your communities RLA(s)

The process of completing a RLAA is one that incorporates a number of stakeholders – local officials, government agencies, and residents, civic and social organizations – into the analysis. Doing so serves the purpose of not just of creating a suitable plan for CRS credit points where applicable, but also making stakeholders more aware of the shared problems repetitive flooding causes in their neighborhoods. This collaborative effort can also empower residents and officials to participate in realistic mitigation measures that may reduce or even eliminate future repetitive flooding problems.

**FEMA Prescribed 5-step Process**

The FEMA-prescribed five step process for conducting an area analyses is as follows:

**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.

These steps do not need to be taken in order, so long as you complete each one. It becomes apparent though that the most logical progression is to follow the steps as listed. The next few subsections will detail the process behind each step.

**Step 1: Advise the property owners**

As you’ve already mapped your community’s repetitive loss area(s), you will also have the address list(s) for the area(s). You’ve seen this list come in useful during the completion of your outreach project (Section 4 of this guidebook), and once again you will be using this data. When notifying your area(s), you will not only want to involve the residents, but other stakeholders as well. Bringing in stakeholders from within the community provides you with invaluable local knowledge about repetitive flooding and can bring residents together around a common threat. Working with
neighborhood associations, civic organizations and non-profits with a local mission can encourage participation amongst the residents. By working with an “inside” organization, the residents living in these repetitive loss areas may feel more comfortable talking and sharing information with an “outsider.”

In a number of cases in which UNO-CHART has been involved, interaction with local residents has led to resident-assisted site visits, sharing of resident-initiated mitigation projects, and more advanced resident surveys and participation in the process. UNO-CHART has been able to attend and present at different organization and association meetings, reaching an audience that may have not been reachable otherwise.

The first thing you want to accomplish is to inform the residents that you are conducting a RLAA. This is accomplished by drafting a letter and mailing it out to the address list you’ve created for your RLA(s). The letter should give some basic information; what is being accomplished, why it is being undertaken, and what is the expected outcome. The letter should also explain to residents that their participation is completely voluntary, and that none of their personal information will be made public.

If you are working with a homeowner’s, civic, or other social organization it might be a good idea to draft the letter with them and have them sign off on it as well. See Appendix X for a copy of letters used by UNO-CHART.

UNO-CHART has always sent out a data sheet with the letter asking the residents some basic information about their structure. This data sheet has also served as a way of drumming up interest and starting a dialogue with the residents about repetitive flooding. One thing you’ll find, if there hasn’t been a recent flood, not many people think about their flooding issues. This letter and data sheet will help the residents to start thinking about it again. Examples of letters and data sheets can be found on pages 46 and 47 of this section.

**Step 2: Data Collection**

As you begin to collect data, keep in mind that there are unlimited sources of data that could potentially pertain to your repetitive loss area. Some common sources of data that you’ll want to examine include:

- **Flood Insurance Data**: Information about the flood zones and past claims should be included for the analysis. The *Flood Insurance Rate Maps* (FIRM) and *Flood Insurance Studies* (FIS) for your community are vital to your RLAA. These documents will give you a framework into which your repetitive flooding problems can be placed: is your area low-lying or in the Special Flood Hazard Area (SFHA)? It may be helpful to include information from local flood insurance studies or even from past flood insurance rate maps, as flood zones may have changed over time.

- **Plans**: Localities and states develop plans for a number of different reasons that are pertinent to repetitive flooding. Most obvious are state *hazard mitigation plans*. These plans must identify hazards that can affect the state and determine which areas are prone to which hazards. Your
community may have developed a hazard mitigation plan as well that will provide you with more localized data about flooding (among other hazards) and identify activities that the local government planned to implement to combat those hazards.

Additionally, your community may have a floodplain management plan that discusses policies and mitigation activities for the community at large. Land use plans also come into play in the past, especially when dealing with land right-of-ways and future development. Stormwater management plans are useful when there is question as to the drainage capacity of an area. Community or neighborhood plans, while not focused on flooding, may provide useful information about planned developments or problems with flooding in the area, as well as information about zoning and neighborhood character.

- **Drainage data:** Information about drainage systems in your community should be available to you. This data may be maintained by the public works department or the city engineer. In larger communities, or those near larger communities, a separate entity such as a sewerage or water board may maintain this data. In addition to understanding the geography of the drainage system, it will be important to know about the capacity and to be able to identify any bottlenecks and learn about any planned upgrades to the system that may affect your RLA.

- **Weather data:** The National Weather Service station that observes your area maintains daily logs of precipitation. Coordinating precipitation data from these stations with information about flood claims or known flood events can help determine how large a precipitation event must be to overwhelm existing drainage and cause a flood event.

Searching FEMA’s website for disaster declarations in your state allows you to identify flood events that were severe enough to warrant state and/or federal resources.

A good source for weather information is the National Climatic Data Center. You can search storm events by state, county/parish, city, date, and more factors. The website is: [http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms](http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms).

1. To begin the search process, enter your state and click on continue.
2. Enter the fields you want to search. You can search by dates, county, event types, # of injuries/deaths, and amounts of property and crop damage. To the right of the search parameters box, you click “list storms” to produce the list. You can also reset the search or enter a new state.
3. The Query results will come up and list all the storm events that matched your search criteria. By clicking on the “location or county” for each storm event, details for that event will pop up in a new screen. See the illustrations on the next page.

- **Resident datasheets:** One dataset that UNO-CHART uses in its analysis comes from local residents. *Resident datasheets* are sent out to residents in the study area, and this brief questionnaire asks them about their experiences with repetitive flooding. Questions such as: their length of time at the property, the type of structure they occupy, and the frequency, height and duration of past floods. It also asks residents to identify any known or perceived causes of the flooding and to identify any mitigation measures they have adopted. An example of a resident datasheet can be found on the next page.

- **Capital Improvements:** Any information about anticipated public infrastructure, drainage or any larger construction projects that are either on the RLA or may impact them should be collected and analyzed to understand what these changes may mean to local drainage.

- **Permitting and Tax Assessor data:** Your permitting office and your tax assessor can provide you with data useful to the analysis. Tax assessors’ data can give you information about the foundation type, value and age of existing structures, as well as estimated structure value. Your permitting office can help you with information about elevation certificates, significant developments in or planned for the area, as well as any stormwater performance studies conducted in the area and post-flood *Residential Substantial Damage Estimator (RSDE)* outcomes.

- **Geographic Information Systems (GIS) data:** *Geographic data* about elevation, hydrographic information, soil types, flood zone boundaries and parcel boundaries are typically available. In some instances, information about past flood events, ground cover, building footprints and zoning changes may be available. This information becomes tremendously valuable and useful when compiling maps of the area; the more GIS “layers” available, the more robust the map.
Alvin Repetitive Flooding Analysis
Flood Protection Data Sheet

Name: ________________________________

Property address: ____________________________, Alvin, TX

1. In what year did you move into the home at this address? ____________

2. What type of foundation does your house have? □ Slab □ Crawlspace □ Post/piles □ Other: ____________

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

4. Has the property ever been flooded or had a water problem? □ Yes □ No (If "No," please skip to question 8)

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

6. What was the deepest that the water got? □ Over first floor: ____________ deep □ In yard only: ____________ deep □ Water kept out of house or building by sandbagging or other protective measure

7. What was the longest time that the water stayed in the house? ______ hours or ______ days a. When was this? ____________ (month/year)

8. What do you feel was the cause of your flooding? Check all that affect your building.
   □ Drainage from nearby properties □ Storm sewer backup
   □ Storm surge from nearby waterways □ Sanitary sewer backup
   □ Clogged undersized drainage catch □ Standing water next to house
   □ Overflow from nearby catch □ Other: ____________

9. Have you taken any flood protection measures on your property? □ Moved utilities content to a higher level □ Elevated all or parts of the building
   □ Graded yard to keep water away from building □ Waterproofed the outside walls
   □ Installed drains or pipes to improved drainage □ Built a wall to keep water away
   □ Sandbagged when water threatened □ Other: ____________

10. Did any of the measures checked in question 8 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 refer to our website (www.floodhelp.uno.edu) for useful information.

~~ Please return this data sheet by June 14th ~~

Figure 27: An example of a resident's data sheet prepared for the City of Alvin by UNO-CHART. This data sheet can be copied and changed to fit your community's needs.
Figure 28: An example of a notification letter prepared by the City of Alvin and UNO-CHART. This letter can be copied and changed to fit your community’s needs. More examples of letters and data sheets can be found in the RLAAs on UNO-CHART’s website: www.floodhelp.uno.edu
There may be more or less data to collect in your community as each community will be different. This list is also not meant to be exhaustive; you may find that your community has more information in differing formats; the important thing here is to look at your area from every angle possible.

**Fieldwork:** An important part of the data collection process is the fieldwork that you will conduct once your RLA has been designated and the data collection process has begun. Fieldwork can be something that is completed in one day or something that is ongoing; especially if there have been recent storms in your community, or recently completed drainage projects. Fieldwork includes:

- Using the map of your repetitive loss area (RLA)
- Using the address list of all the properties in your RLA
- Taking photographs of each and every structure in the area
  - RLS, SRLs, and non-RL properties, businesses, churches, parks structures, etc.
- Noting basic information about each structure
  - Structure type, foundation type, elevation (above street and grade), additional structures (sheds, detached garages), and elevation certificate building diagram numbers to name a few
- Inspecting & photographing roadside drainage ditches/canals/other sources of stormwater drainage visible from the street

More information on what types of data to collect during fieldwork, and the best practices of collecting it will be given in Appendix C.

**Step 3: Mitigation Measures**

You have already been given a comprehensive list of mitigation measures in Section 5 of this guidebook. Not each of these mitigation measures needs to be employed; in fact, in most case some of those measures are inappropriate. In areas that have deep, sustained flooding, barriers are not appropriate as they are not recommended for such flooding.

You, as the official leading the analysis process, have to determine which mitigation measures are best suited to your community and your repetitive loss area(s). You may also find that there are measures not listed in this guidebook that will be sufficient for your community. You should work with the residents and other stakeholders in this analysis to develop an exhaustive list of mitigation measures to reduce your repetitive flooding issues.

**Step 4: Contact Agencies/Organizations that could Affect the Cause or Impacts of the Flooding**

In the analysis process, this step is usually ongoing the entire time. You may make contact with certain agencies and/or organizations in the very beginning of the process or during the data collection step – neighborhood associations, the Army Corps – and others only after you’ve analyzed the data and seen that something is planned down the road – City Engineers, City Drainage, water boards.

You will want to include these different agencies and organizations at every step of the process. Not only will this help give you a “united front” in addressing your community’s repetitive flooding, but it will also ensure that the issue is being addressed from every possible angle. All of this will lead to the reduction or even elimination of your repetitive flooding.
If possible, bi-weekly or monthly meetings or status reports with these agencies and organizations is always a great idea. This will open the lines of communication and make sure that everyone is on the same page. It may be too much to invite all of the residents living in the repetitive loss area to monthly meetings, but if you’re working with some form of resident organization, than they can have representation at these meetings.

**Step 5: Document the Findings**

This is usually completed with the adopted draft of the area analysis. If your community has a website, it is always an excellent idea to post the final report on there. You will also want to have your highest elected/appointed official adopt the area analysis. This is done simply by having them sign off on the analysis. You will have to turn in a copy of each completed repetitive loss area analysis in order to get CRS credit for completing them.

It is UNO-CHART’s practice to post the completed area analysis on their website: [www.floodhelp.uno.edu](http://www.floodhelp.uno.edu) in their draft forms, and request comments from the target and general audience on the report. A two-week window is often given for comments to be offered before the draft is finalized. This two-week comment period is a great way to make sure that all of your stakeholders have the opportunity to properly read the analysis and ask any questions or raise any issues that they might have.

![FEMA REPETITIVE FLOOD PORTAL](Image.png)

*Figure 29: Some of the RLAAs posted on UNO-CHART’s website: www.floodhelp.uno.edu*
Conclusion

This Guidebook was created in order to streamline the process of conducting a repetitive loss area analysis for your community. There are many different sources of information out there, and this Guidebook strived to bring them all together into one comprehensive document.

If you have any comments or questions, please forward them to UNO-CHART by contacting:

Erin Patton Merrick
504-280-1404
ekpatton@uno.edu

Comments will be accepted until September 2011 when the 2012 CRS Coordinator’s Manual is complete, after which this Guidebook will be officially published.
The Community Rating System

A repetitive loss area analysis has benefits for all communities facing repetitive flooding; however, for communities participating in the Community Rating System (CRS) conducting such a process can provide extra perks by providing credit points to improve the community’s class. The CRS is a class based reward system where participating communities are assigned a class between 10 and 1; the lower the class rating, the higher the discount on flood insurance premiums. A better class rating means additional discounts to policyholders in the community because the actions of its floodplain management program exceed minimal standards. Adherence to NFIP regulations means that communities are enforcing the minimum standards when it comes to floodplain management, but the goal of the CRS is to take that a step further. This includes supporting and enforcing the floodplain management regulations of the NFIP, being proactive in reducing flood damage, and instituting and maintaining a comprehensive approach to floodplain management.

CRS Community Responsibility

The “community” in CRS suggests a broad base of participants, which is needed for successful floodplain management. From the state to the resident, the CRS strives to incorporate the wider society into minimizing flood losses. But, ultimately the responsibility and the reward of participation in the Community Rating System fall to the local government, since in the end; it is the local government that is responsible for the community’s floodplain management approach, and the documentation that supports local activities. The residents in that community also share in the responsibility of reducing flood losses. By adhering to the community’s flood damage reduction ordinances, reporting flood conditions, and participating in outreach activities, residents can play an integral role in the reduction of repetitive flood losses.

A community that has not been formally rated in the CRS, or is just entering the program is considered a Class 10 community. Class 10 communities do not receive discounts on flood insurance premiums and do not have to maintain documentation of their floodplain management activities.

The first step in joining the CRS is for the community’s chief executive officer – mayor, city manager, etc. – to appoint a CRS Coordinator to take on the application work. The CRS more often than not requires working within and between many different departments both in and outside of the community. The CRS Coordinator needs to be someone who has some knowledge of inner workings of their community; who handles what, which department oversees what sort projects, and where to file the appropriate forms.

There is no application fee, and all CRS publications including the CRS Coordinator’s Manual are free of charge. There are a few different ways to access the CRS application and Coordinator’s Manual:
Going to http://www.fema.gov/library/viewRecord.do?id=3655 and downloading the informational brochure which also includes and order form for the application and manual

Emailing nfipcrs@iso.com

Calling 317-848-2898

Visiting FEMA’s CRS Resource Center website at http://training.fema.gov/emiweb/crs/

Once the ISO Specialist confirms that the community will likely receive at least 500 points he/she will schedule a verification visit to verify and review the stated activities. Often, during this visit additional activities can be discovered and rules about documenting activities can be verified with knowledgeable ISO Specialist.

After the verification visit, the community is assigned a Class rating that corresponds to the level of activities that the locality is performing and corresponds with a discount in flood insurance premiums. Each corresponding improvement in class adds 5% to the overall discount in flood insurance premiums to each policyholder in the community’s boundaries.

As a full, participating member of the CRS adopts a number of responsibilities critical to maintaining your rating in the CRS. A CRS Coordinator must be designated as the party responsible for maintaining documentation and communicating with relevant agencies. This person must document annual activities and communicate with the ISO about verification procedures, including scheduling the visit and updating annual data, including the list of repetitive loss properties. The community must maintain all permitting records and previous and current flood insurance rate maps and flood insurance studies for the community.

Verification visits occur every five years to ascertain that the community is maintaining the same level of credited activities. Documentation of all floodplain activities must be maintained throughout the verification cycle and presented during the visit. However, if yours is a community that has recently committed heavily to improving its floodplain management program, you may request a modification, which will mean an additional verification visit. The credit points much be maintained over time to maintain class ratings.

CRS Benefits and Costs to the Community

While there is no monetary fee for participation in the CRS, however, some of the activities may require costs to implement. A closer look into of the floodplain management activities detailed in the CRS Coordinator’s Manual shows that many of the activities listed are ones that communities are already undertaking. Credited activities that many communities will find they are already doing include things like outreach to flood prone areas, high water marks for historic floods, freeboard ordinances, maintaining elevation certificates and reading and interpreting FIRMs for interested residents.

However, if you are a community that experiences repetitive flooding, you may have already considered the benefits of reducing losses to
Participation in the CRS offers some distinct benefits in addition to reduced flood premiums. The CRS allows you to compare your floodplain management program to others in the nation. Also, the knowledge passed in through technical assistance from the ISO, state and federal agencies can help improve ratings in the future.

The Emergency Management Institute (EMI) Community Rating System Resource Center
http://training.fema.gov/EMIweb/CRS/

Informational Links to CRS Documents
- "Joining the CRS" – 1 page
- CRS Application – 66 pages
- CRS Coordinators Manual – 564 pages
- CRS Activity Worksheets – 128 pages
- CRS Record Keeping Guidance – 26 pages
MITIGATION ACTION CODES

1.) If you checked the box that says "FLOOD PROTECTION PROVIDED," please enter the letter below (a–f) that best describes the situation:

a. The building was elevated to or above the Base Flood Elevation (BFE).
b. The building was elevated but not to the BFE.
c. The building (non-residential) was floodproofed to the BFE.
d. The building was partially floodproofed (but, not to the BFE).
e. The building was protected by a flood control/stormwater management project.
f. The building was replaced by a new elevated/floodproofed building.

2.) If you checked the box that says "NO BUILDING ON PROPERTY," please enter the letter below (g–i) that best describes the situation.

g. The building was demolished, but not acquired through any program.
h. The building was acquired and demolished as part of a program.
i. The building was relocated out of the floodplain.

MITIGATION FUNDING CODES

3.) Please choose from the following (j–y) to identify the primary and secondary funding sources for the mitigation action described by a–i above.

<table>
<thead>
<tr>
<th>FEMA PROGRAMS</th>
<th>NON FEMA FUNDING SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>j. Hazard Mitigation Grant Program (HMGP)</td>
<td>q. Increased Cost of Compliance (ICC) coverage.</td>
</tr>
<tr>
<td>k. Flood Mitigation Assistance Program (FMA)</td>
<td>r. U.S. Housing &amp; Urban Development (HUD) Community Development Block Grant (CDBG).</td>
</tr>
<tr>
<td>l. Pre-Disaster Mitigation Grant Program (PDMP)</td>
<td>s. U.S. Army Corps of Engineers or Natural Resources Conservation Service (NRCS) Project.</td>
</tr>
<tr>
<td>m. Repetitive Flood Claims (RFC)</td>
<td>t. Other Federal Program.</td>
</tr>
<tr>
<td>n. Severe Repetitive Loss Program (SRL)</td>
<td>u. State Program.</td>
</tr>
<tr>
<td>o. Section 1362 Acquisition Program.</td>
<td>v. Local Program.</td>
</tr>
<tr>
<td>p. Other FEMA Programs</td>
<td>w. Property Owner.</td>
</tr>
</tbody>
</table>

OMB Statement: Public reporting burden for this information collection is estimated to average 28 hours for the application and certification process. This burden includes the time for reviewing the burden estimate; maintaining, revising, disclosing, and providing the information to us. You may send comments regarding the burden estimate to any aspect of the collection, including suggestions for reducing the burden, to: Information Collections Management, U.S. Department of Homeland Security, Emergency Preparedness and Response Directorate, Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472. Paperwork Reduction Project OMB Control Number 1660-0011. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Note: Do not send your completed questionnaire to this address.

Privacy Act: The information contained in this transmission is legally privileged and confidential. Its use is protected under the Privacy Act of 1974, 5 U.S.C. Section 552(a). One of the principal purposes for which the information is provided to the applicable Routine Use(s) cited in the System Notice published at 67 FR 1128 January 23, 2002. The information provided should be used consistently with the purpose(s) for which the records were released as stated in the applicable Routine Use(s) cited herein.

Further, under the Privacy Act of 1974, 5 U.S.C. Section 552(a), personal identifiers, such as names, may be used only for limited purposes. One of the allowable uses of names and flood insurance claims history is to analyze the effectiveness of local flood loss reduction efforts. In addition, the Routine Use further the floodplain management and hazard mitigation goals of the Agency by making more detailed NFIP records available to communities. Communities may use personal identifiers for this purpose only and are prohibited from using them for solicitations, or other reasons.
Fieldwork

Using the map of your repetitive loss area (RLA) and address list that was developed and discussed in Section 3 of this guidebook, it is time to go into the field and collect data on the properties in your RLA. When going into the field, you should have the following items handy:

- Map of your RLA with the boundaries clearly marked
- Address list of all the buildings in your RLA
  - It will be useful to have some form of notation on the address list as to which properties are RL or SRL properties. This can be as simple as highlighting these properties, or writing them in bold font.
- Camera with fully charged battery/back-up power source
- Pen/pencil, highlighter, and clipboard
- Fieldwork template partially filled out
  - Using the fieldwork template provided (below), you should enter the information as you collect the data.
- A business card or article of clothing identifying yourself as a public official/private contractor
  - Residents tend to be weary of persons driving or walking around their neighborhood taking pictures of the homes and writing notes. You may find yourself stopped a few times by curious residents asking your business on their street. You need to make sure you are carrying something that shows them you are on official business.

<table>
<thead>
<tr>
<th>Address</th>
<th>Photo #</th>
<th>No. of Stories</th>
<th>Basement?</th>
<th>Occ</th>
<th>Elevated above grade</th>
<th>Elevated Above Street</th>
<th>Adeq Vents?</th>
<th>Structure Type</th>
<th>Foundation Type</th>
<th>Foundation Condition</th>
<th>EC Diagram #</th>
<th>HVAC</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>123 Main St.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>234 Main St.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>345 Main St.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>456 Main St.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>567 Main St.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>678 Main St.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>789 Main St.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>890 Main St.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>901 Main St.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the example above, the addresses have already been filled in. To make the work easier, I’ve entered the addresses that are RLs in bold font, and highlighted those that are SRLs in yellow. There are 5 RLs – 234, 456, 678, 789, and 901 Main Street – and 2 SRLs – 234 and 789 Main Street in this RLA.

The column headings should remain the same for your fieldwork form. These headings mimic what is in the National Flood Mitigation Data Collection Tool. If your community uses The National Tool to update your RL list, this fieldwork excel file can be used to populate The National Tool and save you some time.

As you go through the fieldwork, you should enter the appropriate information into each column. In some instances, you may not be able to glean the information from the street. That is alright; the point of fieldwork is to collect as much information as possible from the street without interrupting the resident. Sometimes if you are walking the area doing fieldwork, you will see residents and be able to ask them questions. As mentioned above, make sure you are carrying some form of an identifier to show residents that you are on official business (business card, uniform shirt, ID badge, etc.).
### Photo 
You should take at least one photograph of each building. In some cases, you may take more than one if the opportunity allows or the situation calls for you to do so. Make sure you note the photo number in the appropriate column. This will be important later when you are matching photos to their data, or uploading photos to The National Tool. If possible, it is always an excellent idea to include the address in the photo. The photo should capture the entire home and any appurtenant structure (carport, shed, detached garage, etc.). Where there is an unusual circumstance, such as dramatic elevation differences, try to capture that in the pictures.

<table>
<thead>
<tr>
<th>Address</th>
<th>Photo #</th>
<th>No. of Stories</th>
<th>Basement</th>
<th>Occ</th>
<th>Elevated above grade</th>
<th>Elevated Above Street</th>
<th>Adeq Vents</th>
<th>Structure Type</th>
<th>Foundation Type</th>
<th>Foundation Condition</th>
<th>EC Diagram #</th>
<th>HVAC</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>123 Main Street</td>
<td>1, 2</td>
<td>1</td>
<td>NO</td>
<td>YES</td>
<td>2</td>
<td>2, 3</td>
<td>Y</td>
<td>MH</td>
<td>CS</td>
<td>Fair</td>
<td>5</td>
<td>Elevated</td>
<td>Brown Mobile Home</td>
</tr>
<tr>
<td>234 Main Street</td>
<td>3</td>
<td>1</td>
<td>YES</td>
<td>YES</td>
<td>2</td>
<td>1</td>
<td>Y</td>
<td>WF</td>
<td>Post</td>
<td>Good</td>
<td>5</td>
<td>N/A</td>
<td>Blue with ramp</td>
</tr>
<tr>
<td>345 Main Street</td>
<td>4</td>
<td>1</td>
<td>NO</td>
<td>YES</td>
<td>3</td>
<td>1</td>
<td>y</td>
<td>MH</td>
<td>CS</td>
<td>Good</td>
<td>5</td>
<td>Elevated</td>
<td>Cream Mobile Home</td>
</tr>
<tr>
<td>456 Main Street</td>
<td>5, 6, 7</td>
<td>1</td>
<td>NO</td>
<td>YES</td>
<td>3</td>
<td>1</td>
<td>y</td>
<td>MH</td>
<td>CS</td>
<td>Good</td>
<td>5</td>
<td>N/A</td>
<td>White MH</td>
</tr>
<tr>
<td>567 Main Street</td>
<td>8</td>
<td>1</td>
<td>NO</td>
<td>YES</td>
<td>3</td>
<td>1</td>
<td>y</td>
<td>BF</td>
<td>S</td>
<td>Good</td>
<td>1, 2</td>
<td>Elevated</td>
<td>brown brick/garden</td>
</tr>
<tr>
<td>678 Main Street</td>
<td>9</td>
<td>2</td>
<td>NO</td>
<td>YES</td>
<td>3</td>
<td>0, 1</td>
<td>y</td>
<td>MH</td>
<td>CS</td>
<td>Good</td>
<td>8</td>
<td>N/A</td>
<td>Blue/red MH</td>
</tr>
<tr>
<td>789 Main Street</td>
<td>10</td>
<td>1</td>
<td>NO</td>
<td>YES</td>
<td>1</td>
<td>0</td>
<td>y</td>
<td>WF</td>
<td>Piers</td>
<td>Good</td>
<td>5</td>
<td>N/A</td>
<td>green &amp; white</td>
</tr>
<tr>
<td>890 Main Street</td>
<td>11</td>
<td>2</td>
<td>NO</td>
<td>YES</td>
<td>1</td>
<td>0, 1</td>
<td>y</td>
<td>WF</td>
<td>Piers</td>
<td>Good</td>
<td>5</td>
<td>Elevated</td>
<td>Blue house</td>
</tr>
<tr>
<td>901 Main Street</td>
<td>12, 13</td>
<td>2</td>
<td>NO</td>
<td>NO</td>
<td>2, 3</td>
<td>1, 2</td>
<td>y</td>
<td>WF</td>
<td>Post</td>
<td>Good</td>
<td>5</td>
<td>N/A</td>
<td>Dark blue trim</td>
</tr>
</tbody>
</table>

**Photo #:** You should take at least one photograph of each building. In some cases, you may take more than one if the opportunity allows or the situation calls for you to do so. Make sure you note the photo number in the appropriate column. This will be important later when you are matching photos to their data, or uploading photos to The National Tool. If possible, it is always an excellent idea to include the address in the photo. The photo should capture the entire home and any appurtenant structure (carport, shed, detached garage, etc.). Where there is an unusual circumstance, such as dramatic elevation differences, try to capture that in the pictures.

**No. of Stories:** For each property in your RLA, you should note the number of stories. This information can help determine appropriate mitigation measures later in the analysis process. The number assumes there is no basement for the property. If there are dormers on the structure, you should count that as a 2 story house. If only half of the home has a second story, you should count that as a 1.5 story home. If the lowest habitable floor is a full story above grade with a lower area that is used for parking/storage, count it as a single story home.

**Basement:** Once again, noting if the structures have a basement – this includes raised basements – can assist you in determining the appropriate mitigation measure later on in the analysis process. It can also serve as a photograph identifier, just like the number of stories.

**Occ:** Noting if the structure is occupied is will assist you when you are sending out notices or seeking data to add to your analysis, recommending mitigation measures or drainage improvements, to mention a few.
**Elevated above grade:** This refers to the height of the lowest floor (the front door) being above grade. You can enter elevations of “at grade,” “0-1 foot,” “1-2 feet,” and so on. You can estimate this by looking at the number of steps for a slab home: each step equals 8 inches, so 0-1 foot captures that elevation. 6 steps equals 4 feet ($6 \times 8 = 48/12 = 4$).

**Elevated above street (on fill):** This is an estimation of the height of the grade around the structure above the street level. This is more estimation than the “elevation above grade,” though neither is 100% accurate as you will be “eyeballing” the data. In most cases, the elevation above the street will be “0-1” foot, though it can be “none” or even “below street grade.” If it is below street grade, note by how much.

**Adeq (adequate) Vents:** This column should be filled in if the structure is raised on either a crawlspace or stem wall. The term “adequate” refers to the requirement that there be 1 square inch of ventilation per square foot of building in the NFIP Regulations.

**Structure Type:** Most homes will be either wood frame “WF,” or masonry “M,” or brick faced “BF.” If the structure is brick facing over a wood frame, enter it as “M.” You may also come across Mobile Homes, as in the example on page 8 shows; just enter it as “MH.” You can also enter “W/M” if there are additions or parts of the structure that are different. This information will help you in determining the appropriate mitigation measures.
Foundation Type & Condition: Homes will either be on slab or a crawlspace foundation most likely, but some homes can also be on piers, posts or piles. For slab homes enter “S,” crawlspace enter “CS,” and for piers, and posts or piles enter “P.” Don’t worry about whether they are piers, posts, or piles; they are all treated the same when it comes to recommending mitigation measures. Noting the foundation condition as “good,” “fair” or “poor” will also assist you when it comes time to look into mitigation measures.

EC Diagram #: This refers to the diagrams given in the back of the NFIP Elevation Certificate (EC). The EC can be found online on FEMA’s website by searching for “elevation certificate,” or by going directly here: [http://www.fema.gov/library/viewRecord.do?id=1383](http://www.fema.gov/library/viewRecord.do?id=1383).

ECs come with instructions on how they should be filled out, and by whom. For the purpose of fieldwork, the building diagrams we are looking for are on pages 7 – 9 of the EC. There are 10 different diagrams and each has with it a description of which buildings belong under which diagram number. The building diagrams can also be found on the following pages of this Appendix.

HVAC: This refers to the heating, ventilation, and air conditioning structures on the buildings. If visible, you should capture their locations and elevations in the photographs, as well as noting this information on your fieldwork sheet.
**Notes:** This is where you should enter a few words to make the structures photograph truly identifiable. Doing so is vital to match the photograph with the property record and data later on in the analysis process.

The EC building diagrams are on the following pages.
BUILDING DIAGRAMS

The following diagrams illustrate various types of buildings. Compare the features of the building being certified with the features shown in the diagrams and select the diagram most applicable. Enter the diagram number in Item A7, the square footage of crawl space or enclosure(s) and the area of flood openings in square inches in Items A8 a-c, the square footage of attached garage and the area of flood openings in square inches in Items A9 a-c, and the elevations in Items C2 a-h.

In A zones, the floor elevation is taken at the top finished surface of the floor indicated; in V zones, the floor elevation is taken at the bottom of the lowest horizontal structural member (see drawing in instructions for Section C).

**DIAGRAM 1A**

All slab-on-grade single- and multiple-floor buildings (other than split-level) and high-rise buildings, either detached or row type (e.g., townhouses); with or without attached garage.

**DIAGRAM 1D**

All raised-slab-on-grade or slab-on-stem-wall-with-fill single- and multiple-floor buildings (other than split-level), either detached or row type (e.g., townhouses); with or without attached garage.

**DIAGRAM 2**

All single- and multiple-floor buildings with basement (other than split-level) and high-rise buildings with basement, either detached or row type (e.g., townhouses); with or without attached garage.

* A floor that is below ground level (grade) on all sides is considered a basement even if the floor is used for living purposes, or as an office, garage, workshop, etc.

Instructions – Page 7
**Diagram 3**
All split-level buildings that are slab on grade, either detached or row type (e.g., townhouses); with or without attached garage.

**Diagram 4**
All split-level buildings (other than slab-on-grade), either detached or row type (e.g., townhouses); with or without attached garage.

**Diagram 5**
All buildings elevated on piers, posts, piles, columns, or parallel shear walls. No obstructions below the elevated floor.

**Diagram 6**
All buildings elevated on piers, posts, piles, columns, or parallel shear walls with full or partial enclosure below the elevated floor.

---

* A floor that is below ground level (grade) on all sides is considered a basement even if the floor is used for living purposes, or as an office, garage, workshop, etc.

** An "opening" is a permanent opening that allows for the free passage of water automatically in both directions without human intervention. Under the NFIP, a minimum of two openings is required for enclosures or crawlspaces. The openings shall provide a total net area of not less than one square inch for every square foot of area enclosed, excluding any bars, covers, or other covers of the opening. Alternatively, an Individual Engineered Flood Openings Certification or an Evaluation Report issued by the International Code Council Evaluation Service (ICC ES) must be submitted to document that the design of the openings will allow for the automatic equalization of hydraulic flood forces on exterior walls. A window, a door, or a garage door is not considered an opening; openings may be installed in doors. Openings shall be on at least two sides of the enclosed area. If a building has more than one enclosed area, each area shall have openings to allow floodwaters to directly enter. The bottom of the openings must be no higher than one foot above the higher of the exterior or interior grade or floor immediately below the opening. For more guidance on openings, see NFIP Technical Bulletin 1.
All buildings elevated on full-story foundation walls with a partially or fully enclosed area below the elevated floor. This includes walkout levels, where at least one side is at or above grade. The principal use of this building is located in the elevated floors of the building.

Distinguishing Feature — For all zones, the area below the elevated floor is enclosed, either partially or fully. In A zones, the partially or fully enclosed area below the elevated floor is with or without openings present in the walls of the enclosure. Indicate information about enclosure size and openings in Section A — Property Information.

---

All buildings elevated on a crawlspace with the floor of the crawlspace at or above grade on at least one side, with or without an attached garage.

Distinguishing Feature — For all zones, the area below the first floor is enclosed by solid or partial perimeter walls. In A zones, the crawlspace is with or without openings present in the walls of the crawlspace. Indicate information about crawlspace size and openings in Section A — Property Information.

---

All buildings (other than split-level) elevated on a sub-grade crawlspace, with or without attached garage.

Distinguishing Feature — The bottom (crawlspace) floor is at or below grade level (grade) on all sides. "If the distance from the crawlspace floor to the top of the next higher floor is more than 6 feet, or the crawlspace floor is more than 2 feet below the grade (LAG) on all sides, see Diagram 2.

---

* An "opening" is a permanent opening that allows for the free passage of water automatically in both directions without human intervention. Under the NFIP, a minimum of two openings is required for enclosures or crawlspace. The openings shall provide a total net area of net less than one square inch for every square foot of area enclosed, excluding any base, levers, or other covers of the openings. Alternatively, an Individual Engineered Flood Opening Certification or an Evaluation Report issued by the International Code Council Evaluation Service (ICC ES) must be submitted to document that the design of the openings will allow for the automatic equalization of hydrostatic force on exterior walls. A window, door, or a garage door is not considered an opening. All opening may be installed in doors. Openings shall be on at least two sides of the enclosed area. If a building has more than one enclosed area, each area must have openings to allow floodwater to directly enter. The bottom of the openings shall be no higher than one foot above the higher of the exterior or interior grade or floor immediately below the opening. For more guidance on openings, see NFIP Technical Bulletin 1.

** A floor that is below ground level (grade) on all sides is considered a basement even if the floor is used for living purposes, or as an office, garage, workshop, etc.

Instructions — Page 9
After all the data is collected in the field and you return to your office, it is time to enter this information into an electronic file to save. Using the excel file you created to make your fieldwork form, enter the information from the data fields into the excel file. Doing so will create a version of your fieldwork data that can be manipulated. If your community uses The National Tool to update your RL list, make sure all of your abbreviations match the drop down menu tabs on The National Tool.
June 1, 2005

Dear Property Owner:

**Subject: Repetitive Loss Properties**

Since 1974, the City of Tarpon Springs has been a participant in the National Flood Insurance Program (NFIP). In 1992, the City began participating in the NFIP’s Community Rating System (CRS), a Federal Emergency Management Agency (FEMA) program. The CRS recognizes local floodplain management activities that exceed the minimum requirements of the NFIP and grants flood insurance premium discounts based upon these activities. In 1993, the City achieved a Class 8 rating which provides a 16 percent discount for owners who carry flood insurance on properties in Special Flood Hazard Areas (SFHA).

The City of Tarpon Springs has been notified by FEMA that there are currently 67 repetitive loss properties within the City limits. A repetitive loss property is one that has had two or more NFIP losses of at least $1,000.00 each within any 10-year rolling period since 1978. The following information is being provided to those property owners. The purpose of this notification is to inform you of potential hazards associated with property ownership in these areas, and suggest measures that may be taken to protect yourself and your property.


**Flood Hazard:** Properties located in SFHA’s have a 1-percent or greater chance of flooding in any given year. This risk of flooding is not only from hurricanes and tropical storms. Harsh rainstorms can also cause flooding in these areas. In years past, Tarpon Springs has experienced rainstorms, which produced 4” to 6” of rainfall within a 24-hour period. Although, tidal surges that cause most severe flooding have mainly occurred as a result of storms such as Hurricane Elena (1985), Tropical Storm Josephine (1996) and the “No Name Storm” in March 1993.

**Public Warning System:** The Tarpon Springs Public Library, located at 138 E. Lemon Street, has numerous publications on hand, which contain information regarding retrofitting and floodproofing methods that can reduce the risk of flooding.

**Flood Warning System:** In the event of an approaching hurricane, tropical storm or other severe weather, the Pinellas County Department of Civil Emergency Services will issue warnings over the local radio and television stations. Similar warnings can also be heard on the City of Tarpon Springs’ radio station at AM1610 on your dial or sent using the city’s reverse 911 system.
necessary, county and city police and fire departments will issue warnings by means of loud
speakers or door-to-door contact. During such an event, you may be advised to take certain
emergency precautions and/or be given evacuation routes and locations of emergency shelters.

_Flood Safety:_ A copy of Pinellas County’s 2005 Hurricane Guide is included with this letter.
Please take special note of the “10 things to do now” and “as the Storm Approaches” sections of
the guide.

_Flood Insurance:_ Homeowners insurance does not cover loss due to flooding, only flood
insurance policies will cover flood losses. The Federal Flood Insurance Act requires the purchase
of flood insurance for any building located within a SFHA with a federally backed mortgage.
Some lenders require flood insurance regardless of the type of mortgage. If there are no
mortgages on the property, flood insurance may still be acquired for protection from loss. As
well, flood insurance is available whether or not your property is in a flood plain. Please contact
your insurance agent for further information regarding flood insurance.

For assistance with flood map determinations, general flood zone information or elevation
certificates, please contact the Building Division at the address or telephone number listed above.

Very truly yours,

Karen A. Hartzog
CRS Coordinator

Enclosure

This example not only follows the requirements for the repetitive loss outreach project, but also the
requirements for Activity 330. You can see that while they mentioned the property was in a RLA and
some basic information on flood insurance, they did not mention possible funding sources to mitigate
the property or ways to protect the property from repetitive flooding. There was an enclosure to this
mailing; we can assume that they possibly covered those two items in that enclosure.
April 13, 2005

Largo, Florida 33774

Dear

The Federal Emergency Management Agency (FEMA) has advised me that the above referenced property is listed as one of several Repetitive Loss Properties located in Indian Shores. As of this date, there are eleven (11) Indian Shores properties on this list.

A property is placed on this list if it has reported two (2) or more insurance claims for water damage in a ten (10) year period. The dates of the reported losses at the above referenced property were [redacted] and [redacted].

According to the National Weather Service records, the June 18, 1982 claim coincides with a subtropical storm that produced rain, wind, and high tides, and the September 1, 1985 claim coincides with Hurricane Elena, which also produced rain, wind and high tides.

Although the records available to me do not specifically state what the claims were for; a safe assumption would be rising water, in view of the fact that the ground floor of your building is several feet (four or five feet) below Base Flood Elevation (BFE) in that area.
April 13, 2005

I have inspected your building and determined that it is a Federal Emergency Management Agency (FEMA) non-conforming structure in that the first habitable floor is located below the BFE for that area and, as such, is exceptionally prone to flooding.

I have included with this letter, some FEMA literature on retrofitting flood-prone residential structures, as well as information about substantially damaged structures and answers to general questions about the National Flood Insurance Program.

Although the Town cannot mandate bringing your structure into conformity, as you will see after reading this material, it would be to your benefit, as well as the Town’s, to do so.

NOTE: The Department of Community Affairs, Division of Emergency Management (DEM) is pleased to announce that the State of Florida has been allocated approximately $3 Million in project funds under the Flood Mitigation Assistance (FMA) Program by the Federal Emergency Management Agency (FEMA) for the Fiscal Year (FY) 2005. This grant may be of interest to you. Although this project may not apply to your property, we are required to advise you.

If you have any questions, please contact me at [redacted].

Sincerely,

[Signature]

LAWRENCE S. NAVYAN
Building Official

Enclosure

In this example, the letter was personalized with the homeowner’s claims information and name (both of which have been removed). It appears that this letter notifies the resident of the flooding in their area, offers additional FEMA literature on protecting the property from flooding and basic information on the NFIP (flood insurance). The letter does mention at the end that there are monies from FEMA under the FMA grant, it does not say much more than the money is there and that it may or may not help them; nothing on how to apply for grant assistance.