



## **Repetitive Loss Area Analysis**



**September 2013  
City of Jeffersonville**

## Contents

1. Overview
2. RLAA #1: East Chestnut Street
3. RLAA #2: Howard Avenue
4. RLAA #3: Hamburg Pike
5. RLAA #4: Bishop Avenue
6. RLAA #5: Seminole Drive
7. RLAA #6: Loma Vista Drive
8. RLAA #7: Riverview Drive
9. Appendix
  - a. Letter sent to Residents or Property Owners

# Repetitive Loss Area Analysis

## Overview

### Background

The Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP) is continually faced with the task of distributing funds for claims while trying to keep the price of flood insurance at an affordable level. Repetitive loss (RL) properties are of particular concern, which are estimated to cost \$200 million per year in flood insurance claim payments. An NFIP repetitive loss property is defined as a property where two or more flood insurance claims of more than \$1,000 have been paid within a 10-year period since 1978. Repetitive loss properties represent only one percent of all flood insurance policies, but historically they account for nearly one-third of the claim payments (over \$4.5 billion to date). There is constant pressure on the FEMA to increase flood insurance premium rates in order to keep the NFIP in its current self-supporting mode and to minimize the burden of flood damage on the general public. Mitigation of the flood risk to these repetitive loss properties will reduce the overall costs to the NFIP as well as to individual homeowners. It is the goal of this repetitive loss area analysis (RLAA) to examine causes of flooding and suggest mitigation measures, either for the city or the homeowner, to prevent future flooding damage.

Flooding has always been a major concern for the City of Jeffersonville, especially since it is located along the Ohio River. The City of Jeffersonville has a floodwall and levee system near the downtown area to help protect the City from Ohio River flooding. There have been two significant flood events in Jeffersonville in the past four years. The most recent was in April 2011 when the Ohio River flooded and the City closed a number of floodgates for the first time in many years. In September 2009, the Kentuckiana Flash Flood also inundated many areas of the City and caused widespread damage. The drainage conveyance system became overwhelmed and caused flooding throughout the City. Many of the historic insurance claims in the RL area also reflect the March 1997 Ohio River flood event. No study on flooding in Jeffersonville would be complete without mentioning The Great Flood of 1937 which is the worst flood on record and devastated the area.

At this time, Jeffersonville has 15 properties which are considered RL properties. The RLAA is, by definition, an *area* analysis, and examines not only the RL properties, but also nearby properties. To be considered an RL property, flood insurance is/was carried. However, other properties in the area may not have had insurance, so it is considered discriminatory for the local government to help only one property when other homes may be affected by the same problems.

This study is intended to assist the City of Jeffersonville with their flooding problems by examining areas which have a history of repetitive losses, and to suggest mitigation measures to correct the cause of the flooding or reduce property damage. Neither property values nor home insurance rates will be impacted as a result of being included in a RLAA report. In addition, a property considered to be in a repetitive loss area will not necessarily be required to carry flood insurance, although it is highly recommended.

## **Purpose**

The City of Jeffersonville, located in Clark County, Indiana, is currently pursuing enrollment in the NFIP Community Rating System (CRS) program which offers discounts on flood insurance premiums for residents. RLAA reports were determined to be beneficial in the City's CRS program initiatives.

## **Process**

This area analysis follows a FEMA-prescribed five step process outlined in the *2013 CRS Coordinator's Manual*.

Step 1. Advise all the property owners in the repetitive loss areas that the analysis will be conducted.

Step 2. Collect data on each building and determine the cause(s) of the repetitive damage.

Step 3. Review alternative 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.

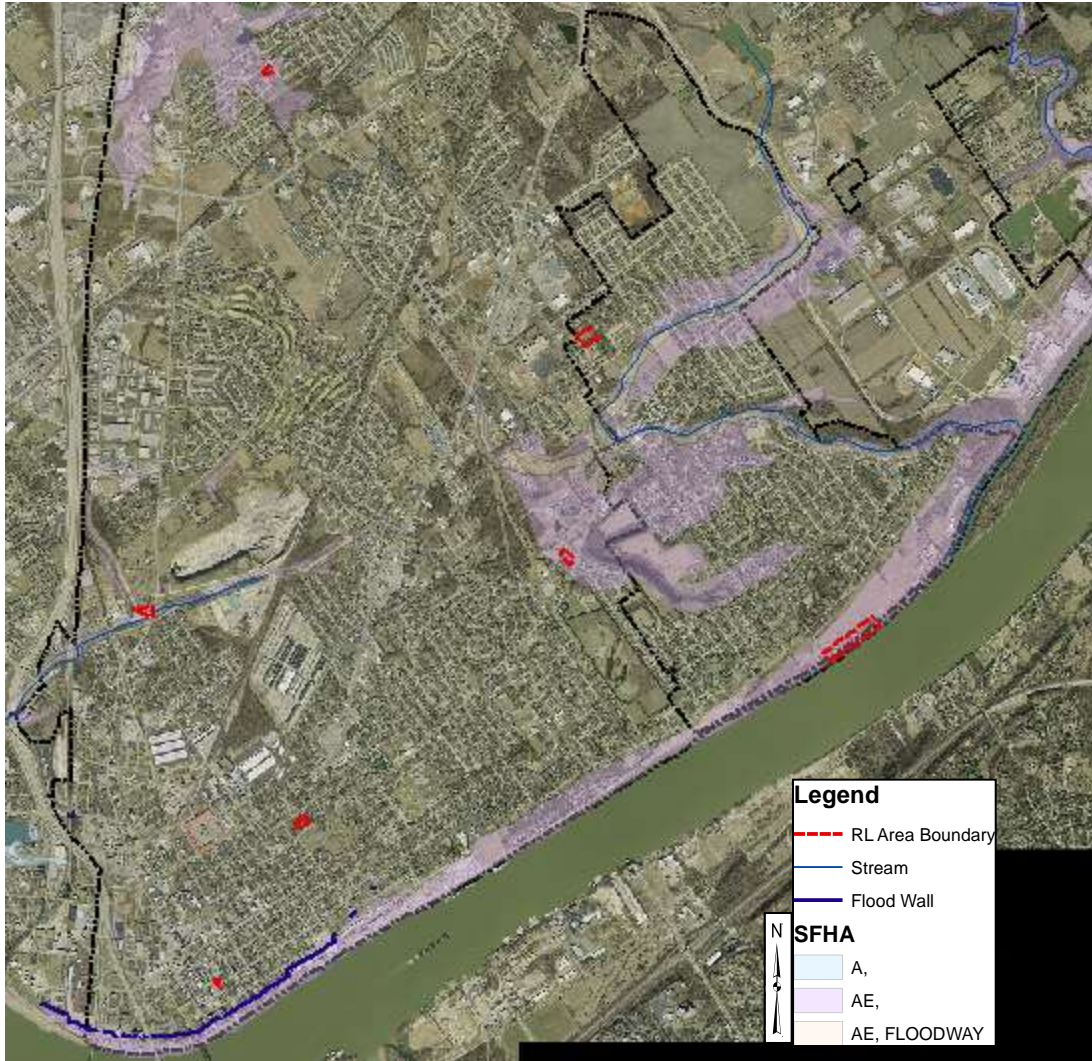
Step 5. Document the findings, including a map showing all properties in the area.

## **Individual Reports**

The reports for the following areas have been included in this analysis:

1. East Chestnut Street
2. Howard Avenue
3. Hamburg Pike
4. Bishop Avenue
5. Seminole Drive
6. Loma Vista Drive
7. Riverview Drive





Map 1: Map of southern portion of City of Jeffersonville with the Repetitive Loss Areas identified.

## Future Report Maintenance

The City will perform periodic evaluations of the overall implementation strategies and improvement projects identified in this RLAA report. As changes occur and both public and private improvements are made, it may be necessary and beneficial to reflect those modifications in these reports.

*These reports will be made available to property owners of the repetitive loss areas and other entities which may have projects that could impact drainage in the repetitive loss area.*

*Prepared for the City of Jeffersonville, Office of the City Engineer, City Hall, 500 Quartermaster Court, Jeffersonville, IN, 47130.*



**Repetitive Loss Area #1  
Intersection of East Chestnut Street  
and Wall Street**



**September 2013  
City of Jeffersonville**

# Repetitive Loss Area Analysis

## Repetitive Loss Area #1 – East Chestnut Street and Wall Street

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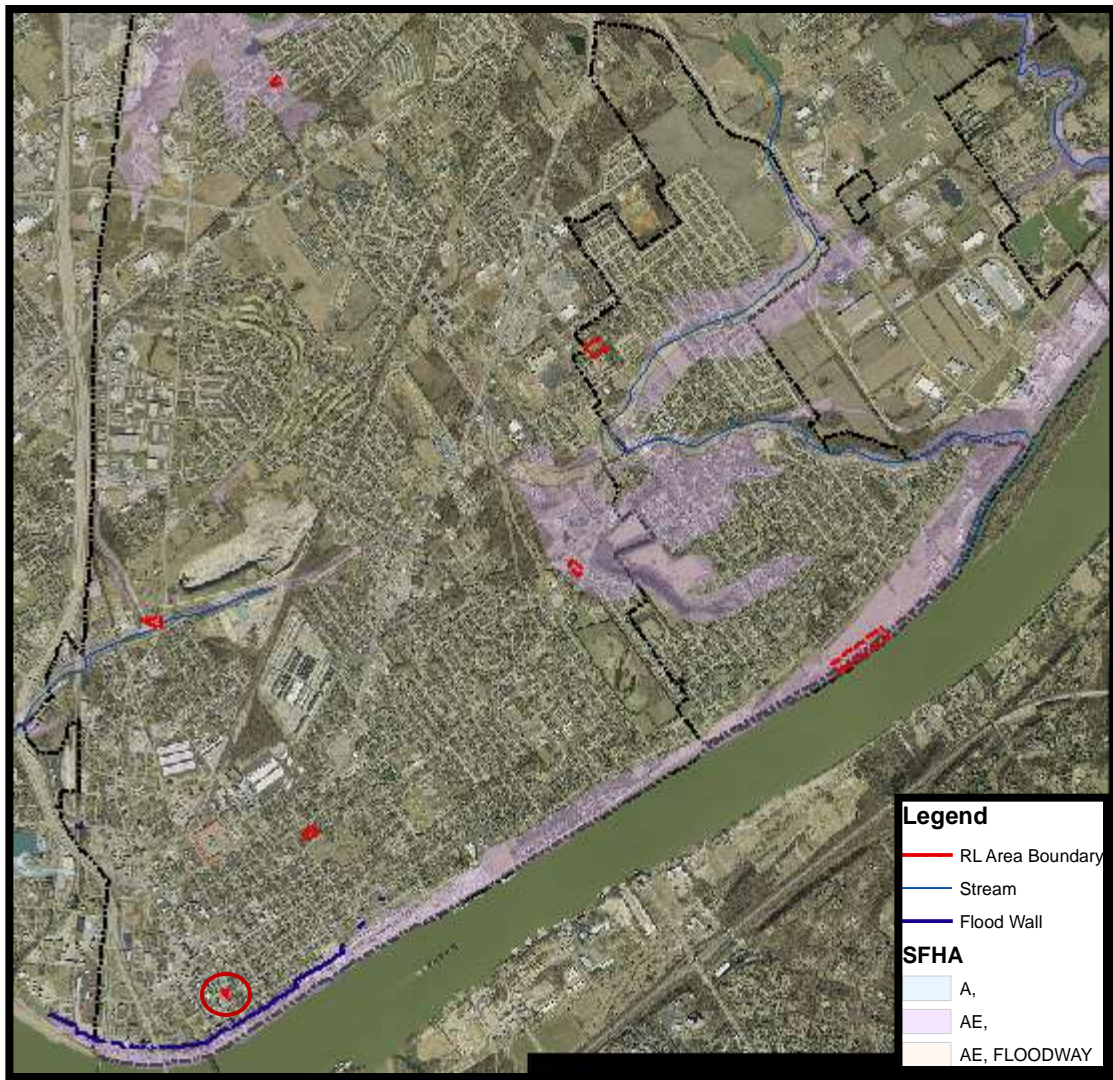
## **Area Analysis**

The East Chestnut Street and Wall Street RL area is comprised of four properties, each containing a single residential building. (See the following two pages for maps of the location and area of analysis.) This intersection is located approximately 0.21 miles from the Ohio River, but is protected by the Ohio River flood wall and levee system. This area is located in the combined sewer overflow (CSO) section of downtown Jeffersonville. The four buildings included in the area analysis were constructed in 1900, 1910, 1910, and 1942.

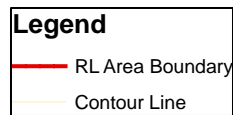
During the site visit a local resident was present to provide flooding accounts in this RL area boundary.

*Note:* The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data is used for floodplain management, mitigation, or research purposes. Therefore, this report does not intend to identify any specific NFIP repetitive loss properties or include claims information for any individual property.





Map 1: Map of southern portion of City of Jeffersonville. (Circled area designates East Chestnut Street).



Map 2: Repetitive Loss Boundary of East Chestnut Street

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## Step 1: Neighborhood Notification

The first step in this process was to notify property owners in the study area about the analysis. Parcel property assessment reports were checked to identify the name and address of the owner of each property in the RL area. The City of Jeffersonville sent a notice to the all residents in the RL area, a copy of which has been included in the appendix.

## Step 2: Data Collection

The second step in the analysis process was to collect relevant data on the problem and the properties exposed to flooding. The sources of information used for this include flood insurance records, County parcel data, anecdotal evidence from local residents, on-site visual assessments, and existing studies relevant to the study area.

Flood insurance claims information was obtained from a FEMA representative specifically for Jeffersonville's RLAA reports. Some dates on the claims extend prior to 1980 and do not necessarily reflect the current exposure. However, many claims throughout Jeffersonville correspond to major flooding events which occurred in March 1997, August 2009, and April 2011. Parcel property assessment detail reports were obtained from the County's geographic information system (GIS) available on 39degreesnorth.com.

## Site Visit

A site visit was completed on August 16, 2013 by Stantec Consulting Services, Inc., as representatives of the City of Jeffersonville, to review site conditions associated with the apparent causes of flooding losses. Illustrative photos in this report were taken of properties in the study area, probable flooding sources, and already implemented flooding mitigation solutions used on the site.



Photo 1 – View of property with historical flooding, viewed from the intersection of East Chestnut Street and Wall Street, facing northwest.



## Resident Input

During the site inspection, representatives of the City spoke with one resident in the RL area who had witnessed flooding within the RL area boundary.

## Apparent Cause of Flooding

The apparent source of past flooding for the intersection of East Chestnut Street and Wall Street is from inadequate combined sewer overflow (CSO) system capacity during especially heavy rain events. The elevation of this intersection is slightly lower than the surrounding areas, which leads to ponding during intense rainfall events. It was indicated from local testimony that when intense storms occurred, the conveyance system could not adequately convey runoff from the intersection, which resulted in surface ponding until that occasionally reached buildings in the area.

One property, at the northwest corner of the intersection, has a basement entrance. No clearly visible flood mitigation measures have been installed to prevent water from entering the doorwell and flowing into the basement. According to a local resident living within the RL area, a sump pump had been installed previously, but the property still floods. Other buildings in the RL area have taken measures to floodproof the exterior walls. Local testimony indicated that a backflow preventer was installed in the basement of one property to prevent basement backups during intense storm events.



Photo 2 – View of back of building in RL area, facing SE. Doorwell is below ground elevation.



### **Step 3. Possible Mitigation Alternatives**

FEMA defines “mitigation” as “any sustained action taken to reduce or eliminate long term risk to life and property from a hazard event.” There are many ways to mitigate a repetitive flood problem. Controlling flood waters is only one possible consideration. Note that “mitigate” does not mean protect forever – it means doing what can be done to reduce the impact of flooding. Even large flood control levees and reservoirs only protect to a certain design level, and thus, they can also fail. Therefore, it’s important to review a full range of alternatives to reduce risk.

There are five general applicable approaches that are recommended by FEMA:

#### **1. Structural Projects**

Structural projects are built to control the flow of water and prevent it from reaching an area. They include levees, reservoirs, barrier systems, and conveyance system improvements. Structural projects are often least disruptive to residents, but can disrupt natural flows and habitats. In some cases, they may be cost-prohibitively expensive.

Possible structural measures that should be considered at this location to reduce stormwater runoff could include, but are not limited to:

- Evaluating and possibly upgrading the size of the receiving conveyance system. (NOTE: Recent City CSO improvement projects have significantly increased storage and conveyance system capacity serving the region.)

#### **2. Property Protection**

Property protection measures are undertaken by individual property owners on a building-by-building or parcel basis. They include building relocation, elevating the structure, retrofitting, sewer backflow protection, and obtaining flood insurance. The cost of each measure varies greatly based on the measure(s) employed.

Possible property protection measures that could be utilized in this area could include, but is not limited to:

- Purchasing a flood insurance policy that will cover surface flooding or sewer backups. Although this measure will not reduce property damage, it will help the owners pay for cleanup and repairs caused by flooding. Renters can also purchase coverage for the contents of the home, even if the building owner does not purchase insurance for the building itself.
- Install backflow preventers in floor drains to prevent overflows when the system surcharges.
- Elevate utilities, such as heating and air conditioning systems, water heaters, and other major appliances to higher floors.

- Dry floodproof windows, doors, and other opens to prevent water from entering buildings.
- Wet floodproof portions of the building so water won't cause extensive damage.

### **3. Preventive Activities**

Preventive activities are taken to reduce or prevent future construction from having a negative impact on the flood-prone area. The City of Jeffersonville manages this through planning, land acquisition, and development regulations. The City's stormwater management ordinance requires new developments to control their stormwater runoff so that peak flow of drainage is no greater than the conditions before the development was completed. In this area, the upstream watershed is already substantially developed, so preventive activities, such as development regulations, will have limited use except for redevelopments in the future.

### **4. Emergency Measures**

In the event of a flood, emergency measures should be taken to minimize danger to persons and damage to property. While major emergency measures are the responsibility of the City or county emergency management staff, individual property owners can stay informed of weather warnings by listening to the National Weather Service NOAA Weather Radio. (See <http://www.nws.noaa.gov/nwr/>). If a heavy rain alert is issued, individual property protection measures can be implemented, such as installing the door on the floodgate or other openings.

Jeffersonville has also recently implemented a voluntary constituent notification system for "smart-phone" owners called YourGOV. This software can be easily installed on "smart-phones," tablets, and other devices to notify residents and businesses about communitywide activities and initiatives. As the system matures and registration increases, the City will investigate opportunities to increase public awareness during emergency situations.

### **5. Public Information**

As stated above, the City has started using an outreach and education program called YourGOV, which will be used in the future to educate and inform residents about various programs and activities that may be of benefit, including information on drainage and flooding.

The City will be conducting an annual outreach project for repetitive loss areas to advise property owners and residents of the flood hazard and ways to protect people and property from flooding.

In addition, the City maintains a Floodplain Management webpage which is intended to inform residents about flood safety, flood insurance, and drainage system maintenance. (See <http://cityofjeff.net>).

## Step 4. Summary of Agencies and Organizations Potentially Affecting the Causes or Impacts of Flooding

The following agencies and organizations were contacted by Stantec, on behalf of Jeffersonville, throughout the development of the RLAA and CRS activities:

- FEMA Region V ISO/CRS Coordinator
- Jeffersonville Stormwater Coordinator
- Jeffersonville City Engineer
- River Hills EDD & RPC
- The Polis Center at Indiana University Purdue University Indianapolis
- French Wetmore, CFM of French & Associates, Ltd. (CRS Program Consultant)
- STARR – Strategic Alliance for Risk Reduction

**Flood Studies:** The following studies and reports were also obtained and reviewed for this RLAA report:

- City of Jeffersonville *Stormwater Master Plan (SWMP)*, December 2012 (Burke)
- City of Jeffersonville *Long-Term Control Plan (LTCP)*, 2009
- *Flood Insurance Study and Flood Insurance Rate Map* for Clark County and Incorporated Areas, FEMA, August 31, 2012
- *Clark County Multi-Hazard Mitigation Plan*, November 2008
- Jeffersonville/Clarksville Flood Control District, *Mill Creek and Cane Run Watershed Analysis*, May 2013 (Strand)
- Town of Clarksville, *Cane Run and Mill Creek Preliminary Drainage Study*, August 2012 (Stantec)

Christopher B. Burke Engineering, LLC developed a Stormwater Master Plan (SWMP) for the City of Jeffersonville, which was published in December 2012. The purpose of the SWMP was to examine the existing conditions by watershed, determine problem/concern areas, and suggest viable alternatives, including flood mitigation measures. This plan includes recommendations to update the City's drainage and stormwater regulations, which will include more aggressive detention standards, as well as retention requirements. The City anticipates working with all appropriate departments to implement coordinated and comprehensive drainage and flooding regulations during 2014. It is anticipated that these regulations will be adopted in 2015. The SWMP has suggested the creation of a Prioritization Plan for Voluntary Property Acquisition (Buyouts) and/or Floodproofing Program for Existing Buildings in the Special Flood Hazard Area (SFHA). The full SWMP can be found online at [www.cityofjeff.net](http://www.cityofjeff.net). The City of Jeffersonville will inform residents of the program when the voluntary program is implemented.

In 2009, the City of Jeffersonville developed a Long Term Control Plan (LTCP) to eliminate and/or minimize Combined Sewer Overflows (CSO) within the City. The EPA has approved the LTCP, which will require the City to spend between \$90 million and \$120 million through 2020 or 2025 to reduce sewer overflows in Jeffersonville. This plan includes a series of improvements that have been or are in the process of being implemented in the area of this property. In 2012,

the City made significant capacity increases to the 10th Street Wastewater Pump Station, which serves this area. These improvements have significantly increased pumping capacity for the combined sewers in this area. Additionally, the City is currently designing and underground storage system in the CSO area, which will provide storage capacity during wet weather events. This could have a positive impact on the repetitive loss areas throughout the CSO areas of the City, which includes this area.

The City has adopted the 2008 Clark County Multi-Hazard Mitigation Plan (MHMP) which was developed to reduce or eliminate long-term risk to human life and property from hazards, including flooding. The plan was developed by River Hills EDD & RPC, which provides economic development and regional planning service support to the county, in conjunction with The Polis Center at Indiana University Purdue University Indianapolis and the Indiana Geological Survey at Indiana University. Emergency Management Agency personnel are primarily responsible for implementing the plan. The MHMP includes a risk assessment, hydrologic and hydraulic modeling, and computer-modeled flood hazard scenarios such as a levee failure using HAZUS-MH. The majority of flooding throughout Jeffersonville, not related to local drainage issues, is primarily due to the Ohio River, Silver Creek, Lick Run, and Lancassange Creek.

FEMA developed a *Flood Insurance Study and Flood Insurance Rate Map* for Clark County, which was published in August 2012. The study was required to update the Digital Flood Insurance Rate Maps (DFIRMs) which define the Special Flood Hazard Area (SFHA) floodplains of Jeffersonville. Hydrologic and hydraulic analyses were performed to establish peak discharge-frequency relationships and develop estimates on flood elevations. FEMA is currently reviewing a Letter of Map Revision (LOMR) which the City of Jeffersonville submitted to revise the preliminary FIRMS. If accepted by FEMA, it will remove some buildings from the SFHA, which may include some buildings in the repetitive loss areas, however this is not related to this particular property.

## **Step 5. Document Findings**

Based on the information reviewed, the following summary has been developed:

1. This is local drainage problem area associated with a sanitary and stormwater pipe system capacity. This location is not in a regulatory floodplain.
2. There are a number of actions property owners in the RL area implement to protect themselves. These actions include purchasing insurance coverage, and preparing an individual emergency response plan.

The following table shows the addresses of properties within the RL area, foundation type, condition, and suggested mitigation measures.



Street Address	City, State, Zip Code	Foundation Type	Condition	Suggested Mitigation Measures*
129 & 131 East Chestnut St.	Jeffersonville, IN 47130	Basement	Unable to assess	Purchase/ maintain flood insurance for building owner/ residents, sewer backflow preventer in floor drain, floodproofing
133 & 135 East Chestnut St.	Jeffersonville, IN 47130	Basement	Unable to assess	Purchase/ maintain flood insurance for building owner/ residents, sewer backflow preventer in floor drain, seal basement opening
311 Wall St.	Jeffersonville, IN 47130	Crawlspace	Unable to assess	Purchase/ maintain flood insurance for building owner/ residents, sewer backup prevention, floodproofing
132 East Chestnut St.	Jeffersonville, IN 47130	Slab on grade	Acceptable	Purchase/maintain flood insurance for building owner/residents, sewer backup prevention, floodproofing

\*Suggested mitigation measures prioritized in order of feasibility/viability.

## Action Items

The homeowner is primarily responsible for implementing the suggested mitigation measures, such as obtaining flood insurance, floodproofing, or regrading to divert flow away from buildings. To minimize damage to property or to avoid the burden of bearing the entire cost of cleanup and repair, it is suggested that personal property protection measures be implemented as soon as feasible. In an on-going basis, the City does provide on-site assistance to all properties throughout Jeffersonville. The City can provide educational materials regarding floodproofing alternatives, as well as ways to minimize risks from flooding events.

The City of Jeffersonville is continually seeking ways to reduce flooding throughout the community and will be researching grant funds to assist homeowners. If a grant is obtained, the funds will be made known to the community members as funds become available through a community outreach/enhancement project.

The City will continue to reference and implement strategies and projects outlined in the Stormwater Master Plan (2012) and the CSO Long-Term Control Plan (2009). Potential improvement strategies and community projects are outlined in these reports that, when implemented, will decrease the risk of flooding in this area. As stated above, the City will be evaluating drainage ordinances and policies in 2014. Projects are implemented based on funding

availability, overall number of properties benefiting, water quality benefits, quality of life enhancements, and other measurable actions.

## **Funding**

There are several possible sources of funding for mitigation projects:

The FEMA Flood Mitigation Assistance (FMA) program was created with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). Funds are provided to assist States and communities with implementing measures which reduce or eliminate the long-term risk of flood damage to buildings or other structures insured under the NFIP. Individual homeowners and businesses may not apply directly to the program, however, the City of Jeffersonville may apply on their behalf.

The types of FMA grants applicable to Jeffersonville are Planning Grants to prepare Flood Mitigation Plans and Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. More information may be found online at [www.fema.gov/flood-mitigation-assistance-program](http://www.fema.gov/flood-mitigation-assistance-program).

The FEMA Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The goal of the HMGP is to reduce loss of life and property due to natural disaster, such as flooding, and to assist communities in implementing mitigation measures immediately following a disaster. More information may be found online at [www.fema.gov/hazard-mitigation-grant-program](http://www.fema.gov/hazard-mitigation-grant-program).

To implement improvements recommended in the Stormwater Master Plan and the CSO Long-Term Control Plan, Jeffersonville may rely on funding collected from the sanitary and drainage user fees, the general revenues fund, and/or available grant dollars that may be available to implement these projects. (Note: Stormwater Master Plan and CSO Long-Term Control Plan funding is prioritized for projects. Prioritization criteria include number of properties impacted, severity of the issue, environmental benefit, and other measures).

## **Recommendations**

1. Residents should prepare for flooding by purchasing insurance coverage and preparing an emergency response plan. Because the property is not located in the Special Flood Hazard Area, a flood insurance policy is less expensive.
2. Properties containing building with low window and door opening should investigate localized protection measures to close and seal such openings to prevent water from entering the basement.
3. All buildings in the property could increase floodproofing protection measures along building perimeters by diverting flows away from buildings, elevating appliances, and relying on temporary barrier systems, where feasible.

4. The City should continue to enforce all regulations designed to prevent flooding from worsening. The City will evaluate ordinances (2014) for the opportunity to enhance detention and retention standards for development and redevelopment, in an effort to minimize urban runoff peak flows and volume.
5. The City should continue to provide residents with information regarding opportunities to protect private properties from flood damage.
6. The City should provide annual reminders, information, references, and technical assistance to residents in repetitive loss areas.
7. The City should continue to implement enhancements outlined in the City's adopted Stormwater Master Plan and CSO Long-Term Control Plan. Because these properties are located in the CSO area, recent and on-going improvements made upstream and downstream of these properties have the potential to increase system capacity and minimize property flooding in the future.

### **Future Report Maintenance**

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**Repetitive Loss Area #2  
Howard Avenue**



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# Repetitive Loss Area Analysis

## Repetitive Loss Area #2 – Howard Avenue

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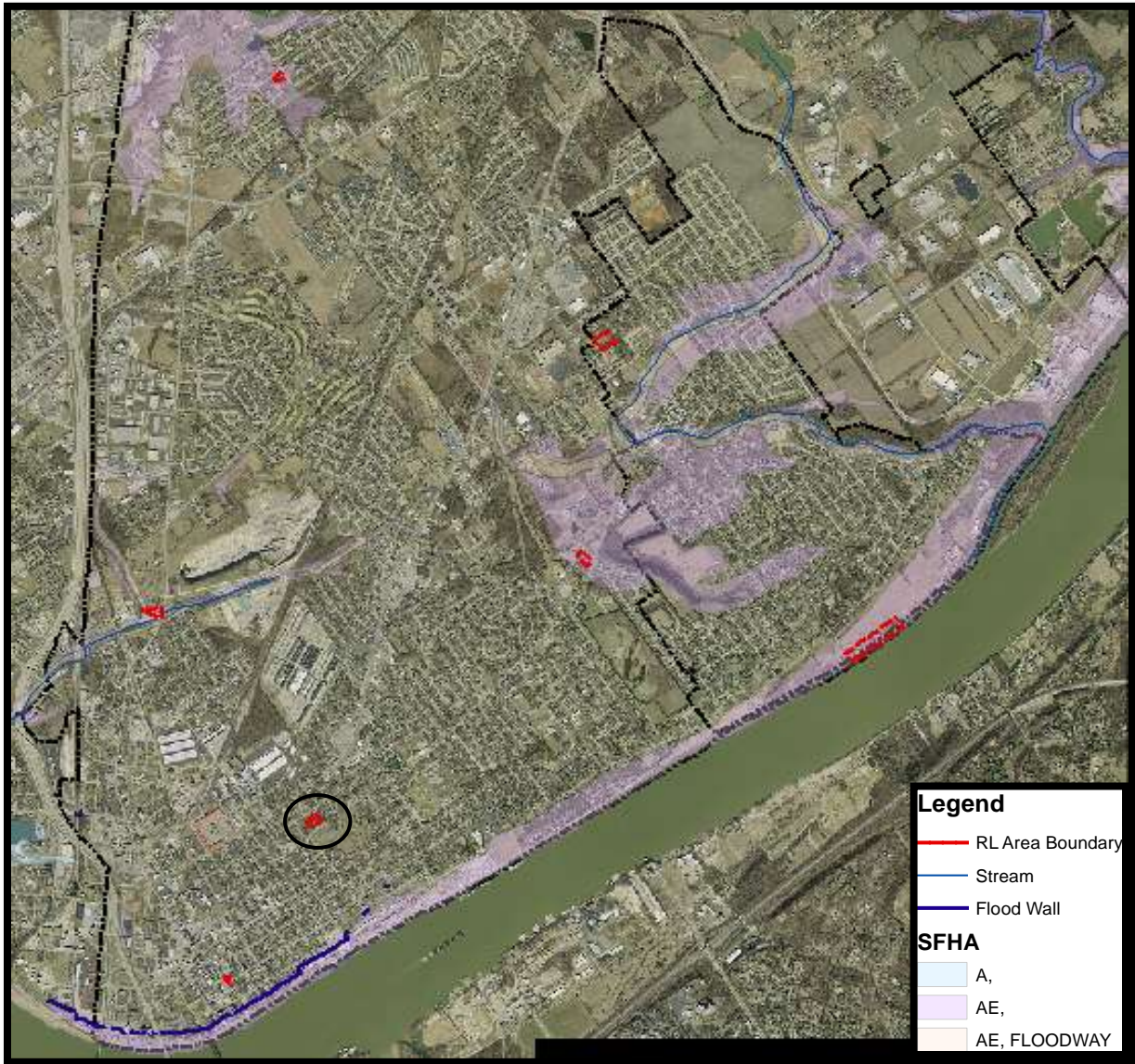
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## **Area Analysis**

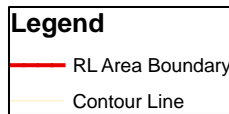
The Howard Avenue RL area is comprised of three parcels containing five apartment complexes. (See the following pages for maps of the location and area of analysis.) Two apartment buildings located along Howard Avenue to the north and to the south have experienced historic flooding. The properties were constructed in 1971 and reported losses in 1980, 1989, and 1992. The surrounding buildings are mainly single-family homes and apartments. A third parcel, located along French Street to the west contains three apartment buildings built in 1959/1960, and contains low elevations on portions of the property. The first floor of the buildings on this property consists of vehicle parking and did not appear to include living/dwelling space for apartment residents. This RL area is located in the combined sewer overflow (CSO) section of Jeffersonville, but is not located in a regulatory floodplain. Each of these three properties has portions that are significantly lower than the surrounding areas, so the flooding issues in the past are suspected to be due to local drainage infrastructure capacity issues. It appears each property has implemented practices to minimize damages from flooding.

*Note:* The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data is used for floodplain management, mitigation, or research purposes. Therefore, this report does not intend to identify any specific NFIP repetitive loss properties or include claims information for any individual property.



Map 1: Map of southern portion of City of Jeffersonville. (Circled area designates Howard Avenue).





Map 2: Repetitive Loss Boundary of Howard Avenue

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## Step 1: Neighborhood Notification

The first step in this process was to notify property owners in the study area about the analysis. Parcel property assessment reports were checked to identify the name and address of the owner of each property in the RL area. The City of Jeffersonville sent a notice to the all residents in the RL area, a copy of which has been included in the appendix.

## Step 2: Data Collection

The second step in the analysis process was to collect relevant data on the problem and the properties exposed to flooding. The sources of information used for this include flood insurance records, County parcel data, anecdotal evidence from local residents, on-site visual assessments, and existing studies relevant to the study area.

Flood insurance claims information was obtained from a FEMA representative specifically for Jeffersonville's RLAA reports. Some dates on the claims extend prior to 1980 and do not



necessarily reflect the current exposure. However, many claims throughout Jeffersonville correspond to major flooding events which occurred in March 1997, August 2009, and April 2011. Parcel property assessment detail reports were obtained from the County's geographic information system (GIS) available on 39degreesnorth.com.

## Site Visit

A site visit was completed on August 16, 2013 by Stantec Consulting Services, Inc., as representatives of the City of Jeffersonville, to review site conditions associated with the apparent causes of flooding losses. Illustrative photos in this report were taken of properties in the study area, probable flooding sources, and already implemented flooding mitigation solutions used on the site.



Photo 1 – View of easternmost property (810 Howard Avenue) from Howard Avenue (photo facing east). (Note the floodwall around the perimeter of the building, seen on the left side of the photo.)



Photo 2: Floodwall installed at the back of the easternmost property.



Photo 3: View of middle property (811 Howard Avenue) in study area, viewed from Howard Avenue (photo facing southwest).





Photo 4: Perimeter drainage of middle property, designed to convey water away from building.



Photo 5: Perimeter of middle property (left, 811 Howard Drive) and westernmost property (right, 820 French Street).

## **Resident Input**

No residents or property owners with information on historic flooding in the region were available at the time of the site visit.

## **Apparent Cause of Flooding**

The source of flooding for Howard Avenue is likely stormwater runoff during heavy rain events, which overwhelms the local drainage system. The elevation of these properties is significantly lower than the surrounding areas, which likely causes flooding. In the study area, it appears flooding mitigation measures have already been installed on easternmost and central properties in the form of a floodwall (approximately four feet in height), a backflow preventer on pipes located within the floodwall, and with perimeter drains installed to convey flow away from the building. These flood protection measures appear to have been installed after 1992, which is when the last insurance claim was filed.

The westernmost parcel (containing basement garage parking) contains a low driveway area that adjoins the individual parking garages. This parcel contains surface drains that receive flow from the middle and westernmost property. There is a possibility that the garages on the westernmost lot experience flooding. As stated above, the basement of these buildings seems to be used only for vehicle parking; therefore, it appears no living space is allocated for the portion of the building most likely to flood.

## **Step 3. Possible Mitigation Alternatives**

FEMA defines “mitigation” as “any sustained action taken to reduce or eliminate long term risk to life and property from a hazard event.” There are many ways to mitigate a repetitive flood problem. Controlling flood waters is only one possible consideration. Note that “mitigate” does not mean protect forever – it means doing what can be done to reduce the impact of flooding. Even large flood control levees and reservoirs only protect to a certain design level, and thus, they can also fail. Therefore, it’s important to review a full range of alternatives to reduce risk.

There are five general applicable approaches that are recommended by FEMA:

### **1. Structural Projects**

Structural projects are built to control the flow of water and prevent it from reaching an area. They include levees, reservoirs, barrier systems, and conveyance system improvements. Structural projects are often least disruptive to residents, but can disrupt natural flows and habitats. In some cases, they may be cost-prohibitively expensive.

Possible structural measures that should be considered at this location to reduce stormwater runoff could include, but are not limited to:

- Evaluating and possibly upgrading the size of the receiving storm sewer system (e.g. increasing inlet capacity, increasing downstream conveyance capacity, etc).

## **2. Property Protection**

Property protection measures are undertaken by individual property owners on a building-by-building or parcel basis. They include building relocation, elevating the structure, retrofitting, sewer backflow protection, and obtaining flood insurance. The cost of each measure varies greatly.

Possible property protection measures that could be utilized in this area, beyond what has already been installed, could include, but is not limited to:

- Purchasing a flood insurance policy that will cover surface flooding. Although this measure will not reduce property damage, it will help the owners pay for cleanup and repairs caused by flooding. Renters can also purchase coverage for the contents of the home, even if the building owner does not purchase insurance for the building itself.
- Building a small floodwall around the property, especially areas below the ground elevation, which are prone to flooding or leakage. (Measure has already been installed on one property.)
- Elevate utilities, such as heating and air conditioning systems, water heaters, and other major appliances to higher floors.
- Wet floodproofing portions of the building so water won't cause extensive damage.

## **3. Preventive Activities**

Preventive activities are taken to reduce or prevent future construction from having a negative impact on the flood-prone area. The City of Jeffersonville manages this through planning, land acquisition, and development regulations. The City's stormwater management ordinance requires new developments to control their stormwater runoff so that peak flow of drainage is no greater than the conditions before the development was completed. In this area, the upstream watershed is essentially at full build-out, so preventive activities will have limited use except for redevelopments in the future.

## **4. Emergency Measures**

In the event of a flood, emergency measures should be taken to minimize danger to persons and damage to property. While major emergency measures are the responsibility of the City or county emergency management staff, individual property owners can stay informed of weather warnings by listening to the National Weather Service NOAA Weather Radio. (See <http://www.nws.noaa.gov/nwr/>). If a heavy rain alert is issued, individual property protection measures can be implemented, such as installing the door on the floodwall or other openings.

Jeffersonville has also recently implemented a voluntary constituent notification system for "smart-phone" owners called YourGOV. This software can be easily installed on "smart-phones," tablets, and other devices to notify residents and businesses about communitywide activities and initiatives. As the system matures and registration increases, the City will investigate opportunities to increase public awareness during emergency situations.



## 5. Public Information

The City will be conducting an annual outreach project for repetitive loss areas to advise property owners and residents of the flood hazard and ways to protect people and property from flooding.

In addition, the City maintains a Floodplain Management webpage which is intended to inform residents about flood safety, flood insurance, and drainage system maintenance. (See <http://cityofjeff.net>).

## Step 4. Summary of Agencies and Organizations Potentially Affecting the Causes or Impacts of Flooding

The following agencies and organizations were contacted by Stantec, on behalf of Jeffersonville, throughout the development of the RLAA and CRS activities:

- FEMA Region V ISO/CRS Coordinator
- Jeffersonville Stormwater Coordinator
- Jeffersonville City Engineer
- River Hills EDD & RPC
- The Polis Center at Indiana University Purdue University Indianapolis
- French Wetmore, CFM of French & Associates, Ltd. (CRS Program Consultant)
- STARR – Strategic Alliance for Risk Reduction

**Flood Studies:** The following studies and reports were also obtained and reviewed for this RLAA report:

- City of Jeffersonville *Stormwater Master Plan (SWMP)*, December 2012 (Burke)
- City of Jeffersonville *Long-Term Control Plan (LTCP)*, 2009
- *Flood Insurance Study and Flood Insurance Rate Map* for Clark County and Incorporated Areas, FEMA, August 31, 2012
- *Clark County Multi-Hazard Mitigation Plan*, November 2008
- Jeffersonville/Clarksville Flood Control District, *Mill Creek and Cane Run Watershed Analysis*, May 2013 (Strand)
- Town of Clarksville, *Cane Run and Mill Creek Preliminary Drainage Study*, August 2012 (Stantec)

Christopher B. Burke Engineering, LLC developed a Stormwater Master Plan (SWMP) for the City of Jeffersonville, which was published in December 2012. The purpose of the SWMP was to examine the existing conditions by watershed, determine problem/concern areas, and suggest viable alternatives, including flood mitigation measures. This plan includes recommendations to update the City's drainage and stormwater regulations, which will include more aggressive detention standards, as well as retention requirements. The City anticipates working with all appropriate departments to implement coordinated and comprehensive drainage and flooding regulations during 2014. It is anticipated that these regulations will be adopted in 2015. The

SWMP has suggested the creation of a Prioritization Plan for Voluntary Property Acquisition (Buyout) and/or Floodproofing Program for Existing Buildings in the Special Flood Hazard Area (SFHA). The full SWMP can be found online at [www.cityofjeff.net](http://www.cityofjeff.net). The City of Jeffersonville will inform residents of the program when the voluntary program is implemented.

In 2009, the City of Jeffersonville developed a Long Term Control Plan (LTCP) to eliminate and/or minimize Combined Sewer Overflows (CSO) within the City. The EPA has approved the LTCP, which will require the City to spend between \$90 million and \$120 million through 2020 or 2025 to reduce sewer overflows in Jeffersonville. This plan includes a series of improvements that have been or are in the process of being implemented in the area of this property. In 2012, the City made significant capacity increases to the 10th Street Wastewater Pump Station, which serves this area. These improvements have significantly increased pumping capacity for the combined sewers in this area. Additionally, the City is currently designing and underground storage system in the CSO area, which will provide storage capacity during wet weather events. This could have a positive impact on the repetitive loss areas throughout the CSO areas of the City.

The City has adopted the Clark County Multi-Hazard Mitigation Plan (MHMP) which was developed to reduce or eliminate long-term risk to human life and property from hazards, including flooding. The plan was developed by River Hills EDD & RPC, which provides economic development and regional planning service support to the county, in conjunction with The Polis Center at Indiana University Purdue University Indianapolis and the Indiana Geological Survey at Indiana University. Emergency Management Agency personnel are primarily responsible for implementing the plan. The MHMP includes a risk assessment, hydrologic and hydraulic modeling, and computer-modeled flood hazard scenarios such as a levee failure using HAZUS-MH. The majority of flooding throughout Jeffersonville, not related to local drainage issues, is primarily due to the Ohio River, Silver Creek, Lick Run, and Lancassange Creek.

FEMA developed a *Flood Insurance Study and Flood Insurance Rate Map* for Clark County, which was published in August 2012. The study was required to update the Digital Flood Insurance Rate Maps (DFIRMS) which define the Special Flood Hazard Area (SFHA) floodplains of Jeffersonville. Hydrologic and hydraulic analyses were performed to establish peak discharge-frequency relationships and develop estimates on flood elevations. FEMA is currently reviewing a Letter of Map Revision (LOMR) which the City of Jeffersonville submitted to revise the preliminary FIRMS. If accepted by FEMA, it will remove some buildings from the SFHA, which may include some buildings in the repetitive loss areas, however this is not related to this particular property.

## **Step 5. Document Findings**

Based on the information reviewed, the following summary has been developed:

1. This is an isolated flood problem area associated with stormwater runoff. This location is not in the Special Flood Hazard Area, however it is located in the Combined Sewer Overflow (CSO) area.

2. There are many actions property owners in the RL area can do to protect themselves beyond what has already been implemented. These actions may include property protection measures, buying insurance coverage, and preparing an individual emergency response plan.

The following table shows the addresses of properties within the RL area, foundation type, condition, and suggested mitigation measures. (Note: As stated above, some mitigation measures have already been implemented, including barrier wall systems and flow diversion measures.)

Street Address	City, State, Zip Code	Foundation Type	Condition	Suggested Mitigation Measures*
810 Howard Avenue	Jeffersonville, IN 47130	Basement	Acceptable	Purchase flood insurance for building owner and apartment residents for contents
811 Howard Avenue	Jeffersonville, IN 47130	Basement	Acceptable	Purchase flood insurance for building owner and apartment residents for contents
820 French Street	Jeffersonville, IN 47130	Basement (garage)	Acceptable	Purchase flooding insurance for building owner and apartment residents for contents; Wet flood-proof basement/garage area to minimize damages from flooding; Install floodwall around base of garages at back of property

\*Suggested mitigation measures prioritized in order of feasibility/viability.

## Action Items

The homeowner is primarily responsible for implementing the suggested mitigation measures, such as obtaining flood insurance, floodproofing, or regrading to divert flow away from buildings. To minimize damage to property or to avoid the burden of bearing the entire cost of cleanup and repair, it is suggested that personal property protection measures be implemented as soon as feasible. In an on-going basis, the City does provide on-site assistance to all properties throughout Jeffersonville. The City can provide educational materials regarding floodproofing alternatives, as well as ways to minimize risks from flooding events.

The City of Jeffersonville is continually seeking ways to reduce flooding throughout the community and will be researching grant funds to assist homeowners. If a grant is obtained, the funds will be made known to the community members as funds become available through a community outreach/enhancement project.

The City will continue to reference and implement strategies and projects outlined in the Stormwater Master Plan (2012) and the CSO Long-Term Control Plan (2009). Potential improvement strategies and community projects are outlined in these reports that, when

implemented, will decrease the risk of flooding in this area. As stated above, the City will be evaluating drainage ordinances and policies in 2014. Projects are implemented based on funding availability, overall number of properties benefiting, water quality benefits, quality of life enhancements, and other measurable actions.

## **Funding**

There are several possible sources of funding for mitigation projects:

The FEMA Flood Mitigation Assistance (FMA) program was created with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). Funds are provided to assist States and communities with implementing measures which reduce or eliminate the long-term risk of flood damage to buildings or other structures insured under the NFIP. Individual homeowners and businesses may not apply directly to the program, however, the City of Jeffersonville may apply on their behalf.

The types of FMA grants applicable to Jeffersonville are Planning Grants to prepare Flood Mitigation Plans and Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. More information may be found online at [www.fema.gov/flood-mitigation-assistance-program](http://www.fema.gov/flood-mitigation-assistance-program).

The FEMA Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The goal of the HMGP is to reduce loss of life and property due to natural disaster, such as flooding, and to assist communities in implementing mitigation measures immediately following a disaster. More information may be found online at [www.fema.gov/hazard-mitigation-grant-program](http://www.fema.gov/hazard-mitigation-grant-program).

To implement improvements recommended in the Stormwater Master Plan and the CSO Long-Term Control Plan, Jeffersonville may rely on funding collected from the sanitary and drainage user fees, the general revenues fund, and/or available grant dollars that may be available to implement these projects. (Note: Stormwater Master Plan and CSO Long-Term Control Plan funding is prioritized for projects. Prioritization criteria include number of properties impacted, severity of the issue, environmental benefit, and other measures).

## **Recommendations**

1. The properties which have already installed structural improvements (barrier systems, etc) should continue to implement localized protection measures such as the floodwall, backflow preventers, and drainage conveyance system. The floodwall door should be installed during rain events. These responses should be summarized into an action plan, developed by the property owner, and should clearly define roles and action measures implemented during wet weather events that have the potential to damage buildings on the property.

2. Properties in the study area could increase floodproofing protection measures along building perimeters by diverting flows away from buildings, elevating heat-pumps, and relying on

temporary barrier systems, where feasible. (As stated, barrier systems have been utilized to protect one building. Temporary systems may be feasible to protect the garages where wet-floodproofing measures are not possible.)

3. Building owners should consider purchasing/maintaining flood insurance. Residents/occupants should consider purchasing/maintaining renters insurance for contents.

4. The City should continue to enforce all regulations designed to prevent flooding from worsening. The City will evaluate ordinances (2014) for the opportunity to enhance detention and retention standards for development and redevelopment, in an effort to minimize urban runoff peak flows and volume.

5. The City should continue to provide residents with information regarding opportunities to protect private properties from flood damage.

6. The City should provide annual reminders, information, references, and technical assistance to residents in repetitive loss areas and throughout the community.

7. The City should continue to implement enhancements outlined in the City's adopted Stormwater Master Plan and CSO Long-Term Control Plan. Because these properties are located in the CSO area, recent and on-going improvements made upstream and downstream of these properties have the potential to increase system capacity and minimize property flooding in the future.

## **Future Report Maintenance**

The City will perform periodic evaluations of the overall implementation strategies and improvement projects identified in this RLAA report. As changes occur and both public and private improvements are made, it may be necessary and beneficial to reflect those modifications in these reports.

*These reports will be made available to property owners of the repetitive loss areas and other entities which may have projects that could impact drainage in the repetitive loss area.*

*Prepared for the City of Jeffersonville, Office of the City Engineer, City Hall, 500 Quartermaster Court, Jeffersonville, IN, 47130.*





**Repetitive Loss Area #3  
Intersection of Hamburg Pike and Mill Creek**



**September 2013  
City of Jeffersonville**

# Repetitive Loss Area Analysis

## Repetitive Loss Area #3 – Intersection of Hamburg Pike and Mill Creek

### Background

The Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP) is continually faced with the task of distributing funds for claims while trying to keep the price of flood insurance at an affordable level. Repetitive loss (RL) properties are of particular concern, which are estimated to cost \$200 million per year in flood insurance claim payments. An NFIP repetitive loss property is defined as a property where two or more flood insurance claims of more than \$1,000 have been paid within a 10-year period since 1978. Repetitive loss properties represent only one percent of all flood insurance policies, but historically they account for nearly one-third of the claim payments (over \$4.5 billion to date). There is constant pressure on the FEMA to increase flood insurance premium rates in order to keep the NFIP in its current self-supporting mode and to minimize the burden of flood damage on the general public. Mitigation of the flood risk to these repetitive loss properties will reduce the overall costs to the NFIP as well as to individual homeowners. It is the goal of this repetitive loss area analysis (RLAA) to examine causes of flooding and suggest mitigation measures, either for the city or the homeowner, to prevent future flooding damage.

Flooding has always been a major concern for the City of Jeffersonville, especially since it is located along the Ohio River. The City of Jeffersonville has a floodwall and levee system near the downtown area to help protect the City from Ohio River flooding. There have been two significant flood events in Jeffersonville in the past four years. The most recent was in April 2011 when the Ohio River flooded and the City closed a number of floodgates for the first time in many years. In September 2009, the Kentuckiana Flash Flood also inundated many areas of the City and caused widespread damage. The drainage conveyance system became overwhelmed and caused flooding throughout the City. Many of the historic insurance claims in the RL area also reflect the March 1997 Ohio River flood event. No study on flooding in Jeffersonville would be complete without mentioning The Great Flood of 1937 which is the worst flood on record and devastated the area.

At this time, Jeffersonville has 15 properties which are considered RL properties. The RLAA is, by definition, an *area* analysis, and examines not only the RL properties, but also nearby properties. To be considered an RL property, flood insurance is/was carried. However, other properties in the area may not have had insurance, so it is considered discriminatory for the local government to help only one property when other homes may be affected by the same problems.

This study is intended to assist the City of Jeffersonville with their flooding problems by examining areas which have a history of repetitive losses, and to suggest mitigation measures to correct the cause of the flooding or reduce property damage. Neither property values nor home insurance rates will be impacted as a result of being included in a RLAA report. In addition, a property considered to be in a repetitive loss area will not necessarily be required to carry flood insurance, although it is highly recommended.

## **Purpose**

The City of Jeffersonville, located in Clark County, Indiana, is currently pursuing enrollment in the NFIP Community Rating System (CRS) program which offers discounts on flood insurance premiums for residents. RLAA reports were determined to be beneficial in the City's CRS program initiatives.

## **Process**

This area analysis follows a FEMA-prescribed five step process outlined in the *2013 CRS Coordinator's Manual*.

Step 1. Advise all the property owners in the repetitive loss areas that the analysis will be conducted.

Step 2. Collect data on each building and determine the cause(s) of the repetitive damage.

Step 3. Review alternative 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 a map showing all properties in the area.

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## **Area Analysis**

The Hamburg Pike RL area is comprised of six residences and one commercial building complex. (See the following pages for maps of the location and area of analysis.) Properties in this area have suffered losses as recently as 2009. At the western portion of the study area is an active commercial building constructed in 1970, which borders a tributary to Mill Creek. Immediately to the northeast is a residential building that was constructed in 1960. The surrounding buildings are mainly single-family homes to the east and an industrial construction center south. The homes have been included in the RL area, but the construction center located to the south and across the open channel is at a higher elevation and, thus, not included in the RL area. The driveway serving the industrial construction center to the south of the study area is comprised of dual 72-inch corrugated metal pipes (CMPs) with flat headwalls.

Of the five residential buildings to the east along Hamburg Pike included in the area analysis, four were constructed in 1950 and one was built in 1970. Two of these properties have a record of filing a single insurance claim, but are not considered to be repetitive loss properties. These properties were included in the repetitive loss area because of their proximity and similar elevation to the RL property.

Portions of this RL area are located in a Special Flood Hazard Area (SFHA) regulatory floodplain. Immediately downstream of the study area is the main branch of Mill Creek. The elevations of the properties in the study area are lower than the surrounding areas. The flooding

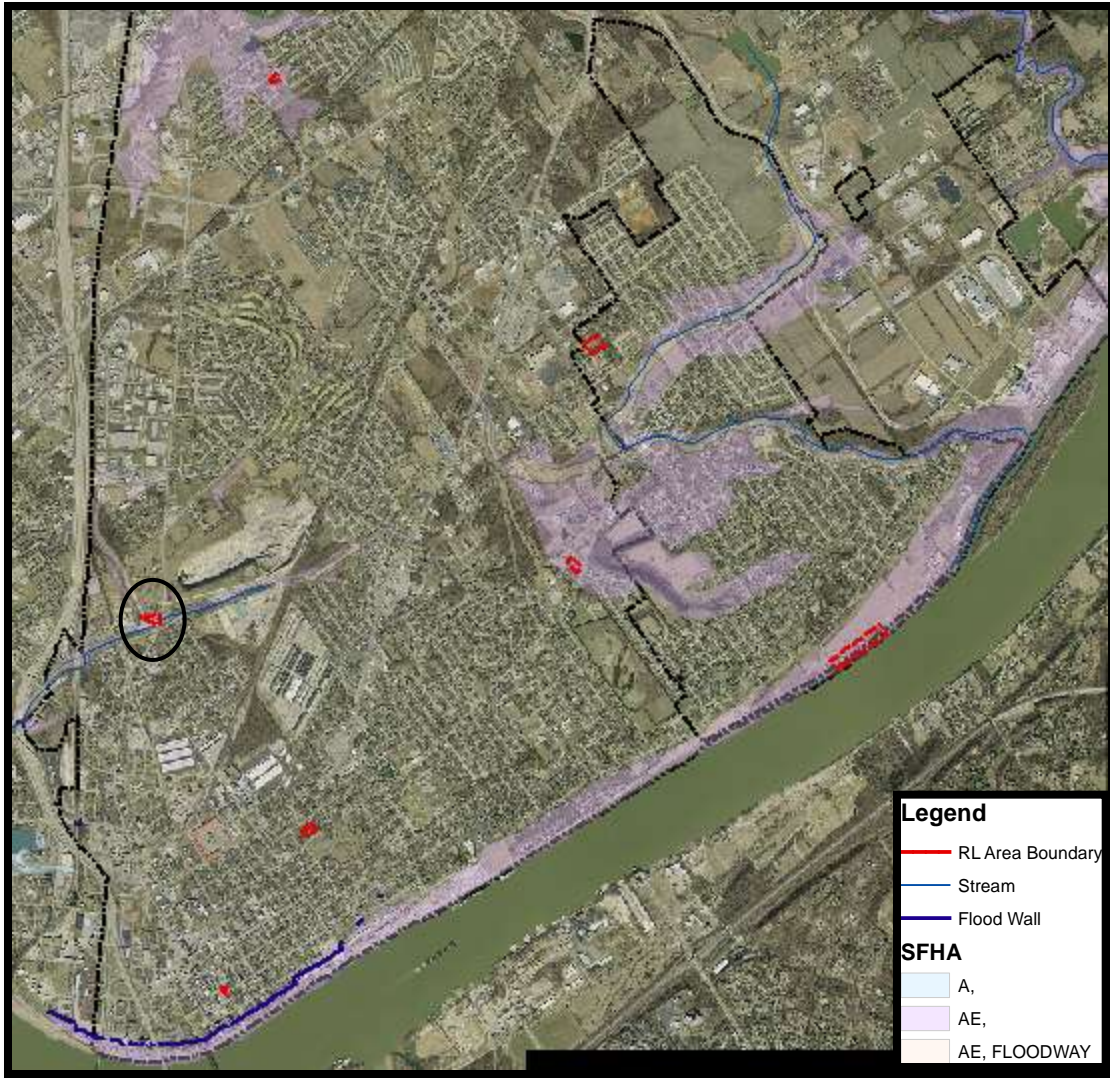
issues are suspected to be due to backwater from Mill Creek during long, heavy storm events and from system capacity limitations in the Mill Creek tributary during short, intense storm events. The most recent floods in this area occurred in 2006 and 2009.

As previously mentioned, immediately south and adjoining the RL study area is a tributary to Mill Creek. The conveyance is heavily vegetated and deeply incised. Beneath the driveway entrance to the industrial construction center to the south of the RL area are two, 72-inch CMPs.

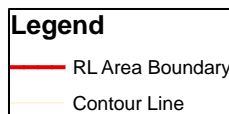
The section of the Hamburg Pike located in front of the RL area is currently undergoing improvements. This has included installing surface inlets in the front yards of the homes located along Hamburg Pike. These improvements are being completed in conjunction with the Hamburg Pike bridge replacement that spans Mill Creek.

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Map 1: Map of southern portion of City of Jeffersonville. (Circled area designates Hamburg Pike RL area).



Map 2: Repetitive Loss Boundary of Intersection of Hamburg Pike and Mill Creek

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## Step 1: Neighborhood Notification

The first step in this process was to notify property owners in the study area about the analysis. Parcel property assessment reports were checked to identify the name and address of the owner of each property in the RL area. The City of Jeffersonville sent a notice to the all residents in the RL area, a copy of which has been included in the appendix.

## Step 2: Data Collection

The second step in the analysis process was to collect relevant data on the problem and the properties exposed to flooding. The sources of information used for this include flood insurance



records, County parcel data, anecdotal evidence from local residents, on-site visual assessments, and existing studies relevant to the study area.

Flood insurance claims information was obtained from a FEMA representative specifically for Jeffersonville's RLAA reports. Some dates on the claims extend prior to 1980 and do not necessarily reflect the current exposure. However, many claims throughout Jeffersonville correspond to major flooding events which occurred in March 1997, August 2009, and April 2011. Parcel property assessment detail reports were obtained from the County's geographic information system (GIS) available on 39degreesnorth.com.

## Site Visit

A site visit was completed on August 16, 2013 by Stantec Consulting Services, Inc., as representatives of the City of Jeffersonville, to review site conditions associated with the apparent causes of flooding losses. Illustrative photos in this report were taken of properties in the study area, probable flooding sources, and already implemented flooding mitigation solutions used on the site.



Photo 1 – View of westernmost property from entrance off of Hamburg Pike. Entrance road and parking lot were damaged by most recent flood according to local testimony.



Photo 2: Commercial buildings on western-most property.



Photo 3: Front view of single-family home located on westernmost property. Living space is limited to the top floor.





Photo 4: Back view of commercial building facing southeast. Picture taken from near open channel. Building located along overbank of tributary to Mill Creek



Photo 5: Drive entrance culvert at southern edge of study area; potential for debris accumulation.



Photo 6: View of other buildings in the RL area. Photo taken from NE corner of RL area, standing on right side of Hamburg Pike facing south.

## **Resident Input**

During the site visit, Stantec spoke with three local residents and employees that have witnessed flooding. Mr. Mike Leuthart, the Treasurer of the Town of Clarksville, and Mr. Dave Wilson showed City representatives the commercial building properties and described the drainage issues which contribute to flooding on the site. City representatives also spoke with Mr. Reuben Powell who lives along Hamburg Pike.

The residents described how sheet flow from upstream enters the site rapidly, which, combined with the creek overflows, causes widespread property flooding. It was stated that the parking lot of the westernmost property was damaged by the flooding. Cars parked in the lot during a flood event also experience damage. During flood events, water enters the commercial building from the back of the building. Owners of the commercial complex toward the western side of the RL area reported sewer backups inside the building during certain wet weather events.

## **Apparent Cause of Flooding**

There are two apparent flooding scenarios. It appears short, intense rainfall events overwhelm the tributary to Mill Creek. Based on field observations and local testimony, it appears this open channel becomes overwhelmed, resulting in drainage flowing across the commercial property

located toward the westernmost side of the study area. During larger, regional events, it appears floodwaters from Mill Creek have the potential to flood properties in the region.

### **Step 3. Possible Mitigation Alternatives**

FEMA defines “mitigation” as “any sustained action taken to reduce or eliminate long term risk to life and property from a hazard event.” There are many ways to mitigate a repetitive flood problem. Controlling flood waters is only one possible consideration. Note that “mitigate” does not mean protect forever – it means doing what can be done to reduce the impact of flooding. Even large flood control levees and reservoirs only protect to a certain design level, and thus, they can also fail. Therefore, it’s important to review a full range of alternatives to reduce risk.

There are five general applicable approaches that are recommended by FEMA:

#### **1. Structural Projects**

Structural projects are built to control the flow of water and prevent it from reaching an area. They include levees, reservoirs, barrier systems, and conveyance system improvements. Structural projects are often least disruptive to residents, but can disrupt natural flows and habitats. In some cases, they may be cost-prohibitively expensive.

Possible structural measures that should be considered at this location to reduce stormwater runoff could include, but are not limited to:

- Evaluating and possibly upgrading the size of the receiving storm sewer system. This may include drainage structure beneath the driveway entrance to the industrial complex immediately south of the study area. *NOTE: The Hamburg Pike drainage structure spanning Mill Creek was recently replaced with an increased effective opening, which will promote hydraulic efficiency in the region. These improvements were made after the most recent flooding event in the area.*
- Installing retention or detention basins further upstream in the watershed to intercept stormwater runoff.
- Performing stream restoration of the Mill Creek tributary adjoining the RL area to prevent blockages from occurring.

#### **2. Property Protection**

Property protection measures are undertaken by individual property owners on a building-by-building or parcel basis. They include building relocation, elevating the structure, retrofitting, sewer backflow protection, and obtaining flood insurance. The cost of each measure varies greatly.

Possible property protection measures that could be utilized in this area, beyond what has already been installed, could include, but is not limited to:



- Purchasing a flood insurance policy that will cover surface flooding. Although this measure will not reduce property damage, it will help the owners pay for cleanup and repairs caused by flooding. Renters can also purchase coverage for the contents of the home, even if the building owner does not purchase insurance for the building itself.
- Installation of a local flood barrier system for area of the property.
- Elevating the structures on the property.
- Elevating utilities, such as heating and air conditioning systems, water heaters, and other major appliances to higher floors, if possible.
- Wet floodproofing portions of the building so water won't cause extensive damage.

### **3. Preventive Activities**

Preventive activities are taken to reduce or prevent future construction from having a negative impact on the flood-prone area. The City of Jeffersonville manages this through planning, land acquisition, and development regulations. The City's stormwater management ordinance requires new developments to control their stormwater runoff so that peak flow of drainage is no greater than the conditions before the development was completed. In this area, the upstream watershed is undergoing development and should be monitored for compliance with City ordinances and regulations related to runoff.

### **4. Emergency Measures**

In the event of a flood, emergency measures should be taken to minimize danger to persons and damage to property. While major emergency measures are the responsibility of the City or county emergency management staff, individual property owners can stay informed of weather warnings by listening to the National Weather Service NOAA Weather Radio. (See <http://www.nws.noaa.gov/nwr/>). If a heavy rain alert is issued, individual property protection measures can be implemented, such as installing the door on the floodwall or other openings.

Jeffersonville has also recently implemented a voluntary constituent notification system for "smart-phone" owners called YourGOV. This software can be easily installed on "smart-phones," tablets, and other devices to notify residents and businesses about communitywide activities and initiatives. As the system matures and registration increases, the City will investigate opportunities to increase public awareness during emergency situations.

### **5. Public Information**

The City will be conducting an annual outreach project for repetitive loss areas to advise property owners and residents of the flood hazard and ways to protect people and property from flooding.

In addition, the City maintains a Floodplain Management webpage which is intended to inform residents about flood safety, flood insurance, and drainage system maintenance. (See <http://cityofjeff.net>).



## Step 4. Summary of Agencies and Organizations Potentially Affecting the Causes or Impacts of Flooding

The following agencies and organizations were contacted by Stantec, on behalf of Jeffersonville, throughout the development of the RLAA and CRS activities:

- FEMA Region V ISO/CRS Coordinator
- Jeffersonville Stormwater Coordinator
- Jeffersonville City Engineer
- River Hills EDD & RPC
- The Polis Center at Indiana University Purdue University Indianapolis
- French Wetmore, CFM of French & Associates, Ltd. (CRS Program Consultant)
- STARR – Strategic Alliance for Risk Reduction

**Flood Studies:** The following studies and reports were also obtained and reviewed for this RLAA report:

- City of Jeffersonville *Stormwater Master Plan (SWMP)*, December 2012 (Burke)
- City of Jeffersonville *Long-Term Control Plan (LTCP)*, 2009
- *Flood Insurance Study and Flood Insurance Rate Map* for Clark County and Incorporated Areas, FEMA, August 31, 2012
- *Clark County Multi-Hazard Mitigation Plan*, November 2008
- Jeffersonville/Clarksville Flood Control District, *Mill Creek and Cane Run Watershed Analysis*, May 2013 (Strand)
- Town of Clarksville, *Cane Run and Mill Creek Preliminary Drainage Study*, August 2012 (Stantec)

Christopher B. Burke Engineering, LLC developed a Stormwater Master Plan (SWMP) for the City of Jeffersonville, which was published in December 2012. The purpose of the SWMP was to examine the existing conditions by watershed, determine problem/concern areas, and suggest viable alternatives, including flood mitigation measures. This plan includes recommendations to update the City's drainage and stormwater regulations, which will include more aggressive detention standards, as well as retention requirements. The City anticipates working with all appropriate departments to implement coordinated and comprehensive drainage and flooding regulations during 2014. It is anticipated that these regulations will be adopted in 2015. The SWMP has suggested the creation of a Prioritization Plan for Voluntary Property Acquisition (Buyout) and/or Floodproofing Program for Existing Buildings in the Special Flood Hazard Area (SFHA). The full SWMP can be found online at [www.cityofjeff.net](http://www.cityofjeff.net). The City of Jeffersonville will inform residents of the program when the voluntary program is implemented.

The City has adopted the Clark County Multi-Hazard Mitigation Plan (MHMP) which was developed to reduce or eliminate long-term risk to human life and property from hazards, including flooding. The plan was developed by River Hills EDD & RPC, which provides economic development and regional planning service support to the county, in conjunction with The Polis Center at Indiana University Purdue University Indianapolis and the Indiana

Geological Survey at Indiana University. Emergency Management Agency personnel are primarily responsible for implementing the plan. The MHMP includes a risk assessment, hydrologic and hydraulic modeling, and computer-modeled flood hazard scenarios such as a levee failure using HAZUS-MH. The majority of flooding throughout Jeffersonville, not related to local drainage issues, is primarily due to the Ohio River, Silver Creek, Lick Run, and Lancassange Creek.

FEMA developed a *Flood Insurance Study and Flood Insurance Rate Map* for Clark County, which was published in August 2012. The study was required to update the Digital Flood Insurance Rate Maps (DFIRMS) which define the Special Flood Hazard Area (SFHA) floodplains of Jeffersonville. Hydrologic and hydraulic analyses were performed to establish peak discharge-frequency relationships and develop estimates on flood elevations. FEMA is currently reviewing a Letter of Map Revision (LOMR) which the City of Jeffersonville submitted to revise the preliminary FIRMS. If accepted by FEMA, it will remove some buildings from the SFHA, which may include some buildings in the repetitive loss areas, however this is not related to this particular property.

## Step 5. Document Findings

Based on the information reviewed, the following summary has been developed:

1. This is an isolated flood problem area associated with stormwater runoff and sanitary sewer overflows. This RL area is located in the Special Flood Hazard Area (SFHA) regulatory floodplain.
2. There are many actions property owners in the RL area can do to protect themselves beyond what has already been implemented, such as property protection measures, buying insurance coverage, and preparing an individual property preparedness plan.

The following table shows the addresses of properties within the RL area, foundation type, condition, and suggested mitigation measures:

Street Address	City, State, Zip Code	Foundation Type	Condition	Suggested Mitigation Measures*
2199 Hamburg Pike	Jeffersonville, IN 47130	Commercial buildings: slab; Residence: basement garage; second floor living space	Acceptable	Install backflow preventers in sanitary line; Purchase flood insurance; install barrier system around buildings on property , elevate building, relocation
2209 Hamburg Pike	Jeffersonville, IN 47130	Slab	Acceptable	Purchase flood insurance; regrade landscape to encourage flow away from building; elevate building
2211 Hamburg Pike	Jeffersonville, IN 47130	Crawlspace	Unable to assess	Purchase flood insurance; install floodwall around

Street Address	City, State, Zip Code	Foundation Type	Condition	Suggested Mitigation Measures*
				property; regrade landscape to encourage flow away from building; elevate building
2213 Hamburg Pike	Jeffersonville, IN 47130	Slab	Acceptable	Purchase flood insurance; regrade landscape to encourage flow away from building; elevate building ( <i>building is currently owned by bank</i> )
2215 Hamburg Pike	Jeffersonville, IN 47130	Slab	Unable to assess	Purchase flood insurance; regrade landscape to encourage flow away from building; elevate building
2217 Hamburg Pike	Jeffersonville, IN 47130	Slab	Acceptable	Purchase flood insurance; regrade landscape to encourage flow away from building; elevate building

\*Suggested mitigation measures prioritized in order of feasibility/viability.

## Action Items

The homeowner is primarily responsible for implementing the suggested mitigation measures, such as obtaining flood insurance, floodproofing, or regrading to divert flow away from buildings. To minimize damage to property or to avoid the burden of bearing the entire cost of cleanup and repair, it is suggested that personal property protection measures be implemented as soon as feasible. In an on-going basis, the City does provide on-site assistance to all properties throughout Jeffersonville. The City can provide educational materials regarding floodproofing alternatives, as well as ways to minimize risks from flooding events.

The City of Jeffersonville is continually seeking ways to reduce flooding throughout the community and will be researching grant funds to assist homeowners. If a grant is obtained, the funds will be made known to the community members as funds become available through a community outreach/enhancement project.

The City will continue to reference and implement strategies and projects outlined in the Stormwater Master Plan (2012). Potential improvement strategies and community projects are outlined in this report that, when implemented, will decrease the risk of flooding in this area. As stated above, the City will be evaluating drainage ordinances and policies in 2014. Projects are implemented based on funding availability, overall number of properties benefiting, water quality benefits, quality of life enhancements, and other measurable actions.

Also noted above, drainage improvements have been made in the area, including the replacement of the bridge spanning Mill Creek on Hamburg Pike, as well as local storm sewer installations in

the front yards of the homes along Hamburg Pike. These improvements will enhance the hydraulic efficiency in the area. The City should continue to monitor and evaluate the performance of these improvements.

## **Funding**

There are several possible sources of funding for mitigation projects:

The FEMA Flood Mitigation Assistance (FMA) program was created with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). Funds are provided to assist States and communities with implementing measures which reduce or eliminate the long-term risk of flood damage to buildings or other structures insured under the NFIP. Individual homeowners and businesses may not apply directly to the program, however, the City of Jeffersonville may apply on their behalf.

The types of FMA grants applicable to Jeffersonville are Planning Grants to prepare Flood Mitigation Plans and Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. More information may be found online at [www.fema.gov/flood-mitigation-assistance-program](http://www.fema.gov/flood-mitigation-assistance-program).

The FEMA Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The goal of the HMGP is to reduce loss of life and property due to natural disaster, such as flooding, and to assist communities in implementing mitigation measures immediately following a disaster. More information may be found online at [www.fema.gov/hazard-mitigation-grant-program](http://www.fema.gov/hazard-mitigation-grant-program).

To implement improvements recommended in the Stormwater Master Plan, Jeffersonville may rely on funding collected from drainage user fees, the general revenues fund, and/or available grant dollars that may be available to implement these projects. (Note: Stormwater Master Plan funding is prioritized for projects. Prioritization criteria include number of properties impacted, severity of the issue, environmental benefit, and other measures).

## **Recommendations**

1. The properties which have suffered losses should implement localized protection measures such as a floodwall, backflow preventers, and elevation of structures.
2. Properties in the study area may be able to lessen flooding during smaller events by diverting flows away from buildings, elevating heat-pumps, and relying on temporary barrier systems, where feasible.
3. Building owners should consider purchasing/maintaining flood insurance. Residents/occupants should consider purchasing/ maintaining renters insurance for contents.



4. The City should continue to enforce all regulations designed to prevent flooding from worsening. The City will evaluate ordinances (2014) for the opportunity to enhance detention and retention standards for development and redevelopment, in an effort to minimize urban runoff peak flows and volume.
5. The City should continue to provide residents with information regarding opportunities to protect private properties from flood damage.
6. The City should provide annual reminders, information, references, and technical assistance to residents in repetitive loss areas.
7. The City should continue to implement enhancements outlined in the City's adopted Stormwater Master Plan.
8. The City should continue to monitor the performance of the drainage system in the area during rainfall events, including the surface inlet capacity for the storm sewers installed along Hamburg Pike, as well as the hydraulic performance of the new bridge spanning Mill Creek.

### **Future Report Maintenance**

The City will perform periodic evaluations of the overall implementation strategies and improvement projects identified in this RLAA report. As changes occur and both public and private improvements are made, it may be necessary and beneficial to reflect those modifications in these reports.

*These reports will be made available to property owners of the repetitive loss areas and other entities which may have projects that could impact drainage in the repetitive loss area.*

*Prepared for the City of Jeffersonville, Office of the City Engineer, City Hall, 500 Quartermaster Court, Jeffersonville, IN, 47130.*



**Repetitive Loss Area #4  
Bishop Road**



**September 2013  
City of Jeffersonville**

# Repetitive Loss Area Analysis

## Repetitive Loss Area #4 – Bishop Road

### Background

The Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP) is continually faced with the task of distributing funds for claims while trying to keep the price of flood insurance at an affordable level. Repetitive loss (RL) properties are of particular concern, which are estimated to cost \$200 million per year in flood insurance claim payments. An NFIP repetitive loss property is defined as a property where two or more flood insurance claims of more than \$1,000 have been paid within a 10-year period since 1978. Repetitive loss properties represent only one percent of all flood insurance policies, but historically they account for nearly one-third of the claim payments (over \$4.5 billion to date). There is constant pressure on the FEMA to increase flood insurance premium rates in order to keep the NFIP in its current self-supporting mode and to minimize the burden of flood damage on the general public. Mitigation of the flood risk to these repetitive loss properties will reduce the overall costs to the NFIP as well as to individual homeowners. It is the goal of this repetitive loss area analysis (RLAA) to examine causes of flooding and suggest mitigation measures, either for the city or the homeowner, to prevent future flooding damage.

Flooding has always been a major concern for the City of Jeffersonville, especially since it is located along the Ohio River. The City of Jeffersonville has a floodwall and levee system near the downtown area to help protect the City from Ohio River flooding. There have been two significant flood events in Jeffersonville in the past four years. The most recent was in April 2011 when the Ohio River flooded and the City closed a number of floodgates for the first time in many years. In September 2009, the Kentuckiana Flash Flood also inundated many areas of the City and caused widespread damage. The drainage conveyance system became overwhelmed and caused flooding throughout the City. Many of the historic insurance claims in the RL area also reflect the March 1997 Ohio River flood event. No study on flooding in Jeffersonville would be complete without mentioning The Great Flood of 1937 which is the worst flood on record and devastated the area.

At this time, Jeffersonville has 15 properties which are considered RL properties. The RLAA is, by definition, an *area* analysis, and examines not only the RL properties, but also nearby properties. To be considered an RL property, flood insurance is/was carried. However, other properties in the area may not have had insurance, so it is considered discriminatory for the local government to help only one property when other homes may be affected by the same problems.

This study is intended to assist the City of Jeffersonville with their flooding problems by examining areas which have a history of repetitive losses, and to suggest mitigation measures to correct the cause of the flooding or reduce property damage. Neither property values nor home insurance rates will be impacted as a result of being included in a RLAA report. In addition, a property considered to be in a repetitive loss area will not necessarily be required to carry flood insurance, although it is highly recommended.

## **Purpose**

The City of Jeffersonville, located in Clark County, Indiana, is currently pursuing enrollment in the NFIP Community Rating System (CRS) program which offers discounts on flood insurance premiums for residents. RLAA reports were determined to be beneficial in the City's CRS program initiatives.

## **Process**

This area analysis follows a FEMA-prescribed five step process outlined in the *2013 CRS Coordinator's Manual*.

- Step 1. Advise all the property owners in the repetitive loss areas that the analysis will be conducted.
- Step 2. Collect data on each building and determine the cause(s) of the repetitive damage.
- Step 3. Review alternative 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 a map showing all properties in the area.

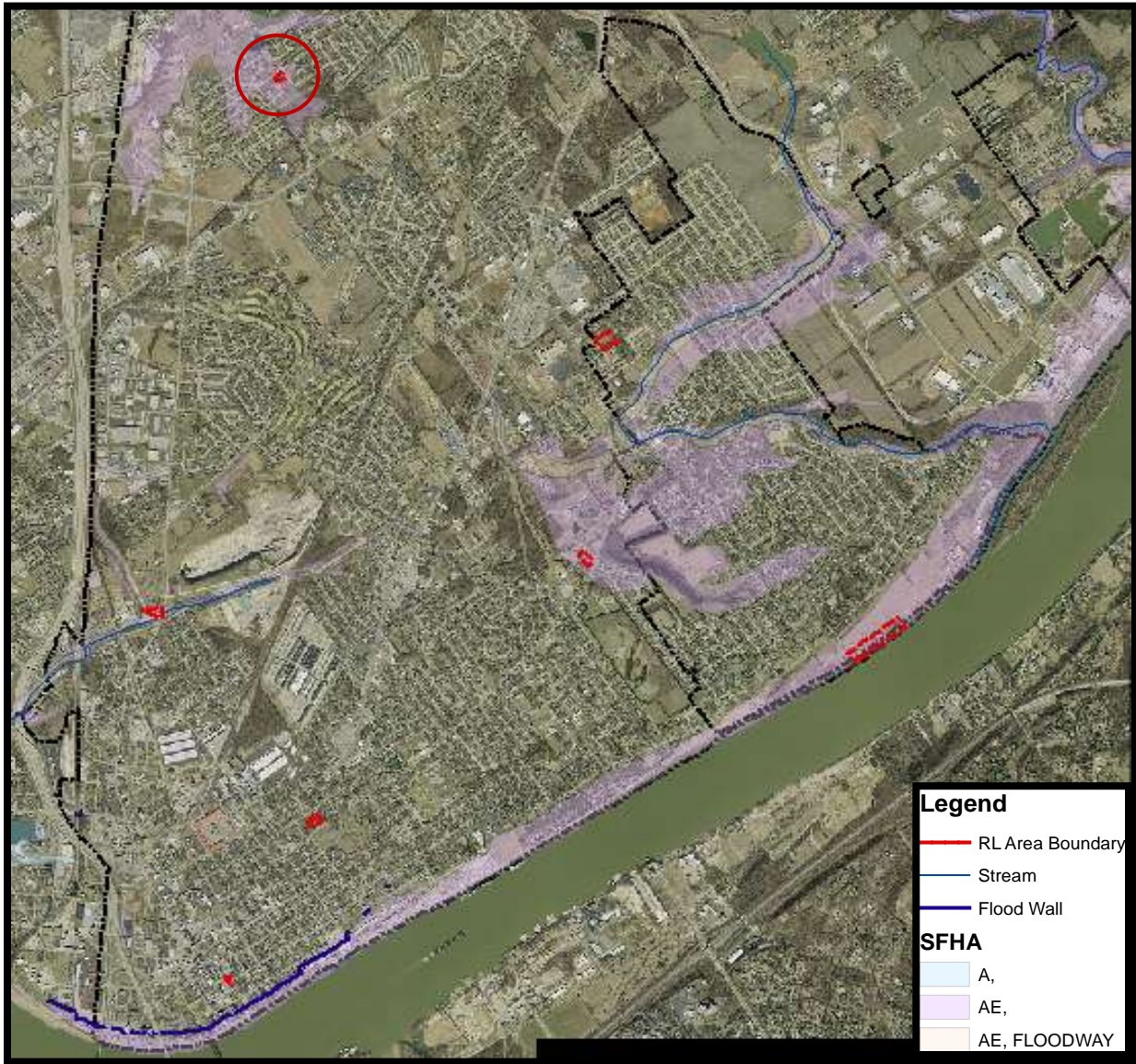
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## **Area Analysis**

The Bishop Road area analysis in Jeffersonville contains one single-family residence with a history of flooding. The surrounding buildings are single-family homes, but it was determined that they do not experience the similar flooding as the aforementioned property, thus surrounding properties were not included in this repetitive loss (RL) area analysis. (See the maps on the following two pages for the location and area of analysis.) The home located on the property was constructed in 1978 and reported losses in 1997 and 2001. This area is not located in the combined sewer overflow (CSO) section of Jeffersonville, however, it is located within a regulatory floodplain of the Lick Run watershed. The property elevation is lower than the surrounding areas. A drainage ditch (tributary to Lick Run) is located along the northeast side of the property which flows toward the northwest. Upstream of the property has been channelized for approximately 600 feet. At the northernmost corner along the property, the open channel flows beneath Bishop Road through two adjoining concrete box culverts. It was evident that these structures were installed at different points in time. The original box culvert appears to have been cast in place. A larger, precast structure appears to have been placed sometime after the original roadway construction. No plans were available for when this additional structure was added. However, based on the condition of the precast structure, it is estimated to have been installed within the last 20 years. Downstream of Bishop Road, the open channel conveyance has been channelized using a combination of a retaining wall and grouted riprap.

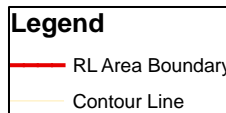


*Note:* The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data is used for floodplain management, mitigation, or research purposes. Therefore, this report does not intend to identify any specific NFIP repetitive loss properties or include claims information for any individual property.



Map 1: Map of southern portion of City of Jeffersonville. (Circled area designates Bishop Road).





Map 2: Property Boundary of Bishop Road RL area.

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## Step 1: Neighborhood Notification

The first step in this process was to notify property owners in the study area about the analysis. Parcel property assessment reports were checked to identify the name and address of the owner of each property in the RL area. The City of Jeffersonville sent a notice to the all residents in the RL area, a copy of which has been included in the appendix.

## Step 2: Data Collection

The second step in the analysis process was to collect relevant data on the problem and the properties exposed to flooding. The sources of information used for this include flood insurance records, County parcel data, anecdotal evidence from local residents, on-site visual assessments, and existing studies relevant to the study area.

Flood insurance claims information was obtained from a FEMA representative specifically for Jeffersonville's RLAA reports. Some dates on the claims extend prior to 1980 and do not necessarily reflect the current exposure. However, many claims throughout Jeffersonville correspond to major flooding events which occurred in March 1997, August 2009, and April 2011. Parcel property assessment detail reports were obtained from the County's geographic information system (GIS) available on 39degreesnorth.com.

A site visit was completed on August 16, 2013 by Stantec Consulting Services, Inc., as representatives of the City of Jeffersonville, to review site conditions associated with apparent causes of flooding losses. Illustrative photos in this report were taken of properties in the study area, potential flooding sources, and already implemented flooding mitigation solutions used on the site.



Photo 1 – View of the property in the RL area, taken from Bishop Road, facing east.





Photo 2: View of conveyance system facing roadway. Photo taken from NE side of property, facing NW. Storage shed adjoins conveyance shown in the left side of the photo.



Photo 3: View of opposite side of drainage channel culvert, facing SE; downstream of Bishop Road and property.



## **Resident Input**

No residents or property owners with information on historic flooding in the area were available at the time of the site visit.

## **Apparent Cause of Flooding**

The source of flooding for the Bishop Road RL area is most likely due to several factors that are compounded during especially heavy rain events. The elevation of this property is lower than the surrounding areas. Additionally, upstream and downstream of the property have been channelized to accommodate the original subdivision development. This channelization decreases in-channel storage capacity for flood suppression and increased flow velocities. Finally, the drainage structure beneath Bishop Road consists of two side-by-side concrete culverts. This configuration can result in accumulations of debris, causing partial blockages in the drainage system. Though this property has no record of flooding since 2001, it is possible that extended and/or intense rainfall events, in conjunction with debris accumulation at the drainage structure beneath Bishop Road, could result in property flooding. This lack of recent flooding could indicate a more proactive drainage maintenance routine to remove blockages and debris accumulations.

## **Step 3. Possible Mitigation Alternatives**

FEMA defines “mitigation” as “any sustained action taken to reduce or eliminate long term risk to life and property from a hazard event.” There are many ways to mitigate a repetitive flood problem. Controlling flood waters is only one possible consideration. Note that “mitigate” does not mean protect forever – it means doing what can be done to reduce the impact of flooding. Even large flood control levees and reservoirs only protect to a certain design level, and thus, they can also fail. Therefore, it’s important to review a full range of alternatives to reduce risk.

There are five general applicable approaches that are recommended by FEMA:

### **1. Structural Projects**

Structural projects are built to control the flow of water and prevent it from reaching an area. They include levees, reservoirs, barrier systems, and conveyance system improvements. Structural projects are often least disruptive to residents, but can disrupt natural flows and habitats. In some cases, they may be cost-prohibitively expensive.

Possible structural measures that should be considered at this location to reduce stormwater runoff could include, but are not limited to:

- Replace the existing dual box culvert configuration with a single, large structure to improve hydraulic efficiency.
- Evaluating and possibly increasing the size of the drainage channel.
- Evaluate the feasibility of providing enhanced upstream detention.

## **2. Property Protection**

Property protection measures are undertaken by individual property owners on a building-by-building or parcel basis. They include building relocation, elevating the structure, retrofitting, sewer backflow protection, and obtaining flood insurance. The cost of each measure varies greatly.

Possible property protection measures that could be utilized in this area, beyond what has already been done, could include, but is not limited to:

- Purchasing a flood insurance policy that will cover surface flooding. Although this measure will not reduce property damage, it will help the owners pay for cleanup and repairs caused by flooding.
- Landscaping or regrading the property to prevent water from entering the building.
- Building a small floodwall along the drainage channel to prevent or reduce the amount of water entering the property.
- Wet floodproofing portions of the building so water won't cause significant damage, should floodwaters enter the structure.

## **3. Preventive Activities**

Preventive activities are taken to reduce or prevent future construction from having a negative impact on the flood-prone area. The City of Jeffersonville manages this through planning, land acquisition, and development regulations. The City's stormwater management ordinance requires new developments to control their stormwater runoff so that peak flow of drainage is no greater than the conditions before the development was completed. In this area, the upstream watershed is already substantially developed. Preventive activities will have limited effect unless significant redevelopment occurs in the future.

As previously mentioned, the structure beneath Bishop Road has the potential to accumulate debris, which could decrease the hydraulic capacity. The City may elect to place this structure on a more frequent schedule for inspection and debris removal.

- Inspect culvert for debris accumulation once a quarter.
- Inspect culvert prior to projections of a significant storm event.
- Monitor culvert during rainfall events to provide appropriate response in the event debris begins to accumulate and/or flow efficiency is disrupted.

## **4. Emergency Measures**

In the event of a flood, emergency measures should be taken to minimize danger to persons and damage to property. While major emergency measures are the responsibility of the City or county emergency management staff, individual property owners can stay informed of weather warnings by listening to the National Weather Service NOAA Weather Radio. (See <http://www.nws.noaa.gov/nwr/>).

Jeffersonville has also recently implemented a voluntary constituent notification system for “smart-phone” owners called YourGOV. This software can be easily installed on “smart-phones,” tablets, and other devices to notify residents and businesses about communitywide activities and initiatives. As the system matures and registration increases, the City will investigate opportunities to increase public awareness during emergency situations.

As mentioned above, it may be beneficial for City maintenance crews to monitor channel and culvert flow conditions during rainfall events. Should debris begin to accumulate, crews may be able to alleviate some of the congestion, if able to do so without compromising the safety of staff and the public.

## **5. Public Information**

As stated above, the City has started using an outreach and education program called YourGOV, which will be used in the future to educate and inform residents about various programs and activities that may be of benefit, including information on drainage and flooding.

The City will be conducting an annual outreach project for repetitive loss areas to advise property owners and residents of the flood hazard and ways to protect people and property from flooding.

In addition, the City maintains a Floodplain Management webpage which is intended to inform residents about flood safety, flood insurance, and drainage system maintenance. (See <http://cityofjeff.net>).

## **Step 4. Summary of Agencies and Organizations Potentially Affecting the Causes or Impacts of Flooding**

The following agencies and organizations were contacted by Stantec, on behalf of Jeffersonville, throughout the development of the RLAA and CRS activities:

- FEMA Region V ISO/CRS Coordinator
- Jeffersonville Stormwater Coordinator
- Jeffersonville City Engineer
- River Hills EDD & RPC
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**Flood Studies:** The following studies and reports were also obtained and reviewed for this RLAA report:

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- *Flood Insurance Study and Flood Insurance Rate Map* for Clark County and Incorporated Areas, FEMA, August 31, 2012
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- Town of Clarksville, *Cane Run and Mill Creek Preliminary Drainage Study*, August 2012 (Stantec)

Christopher B. Burke Engineering, LLC developed a Stormwater Master Plan (SWMP) for the City of Jeffersonville, which was published in December 2012. The purpose of the SWMP was to examine the existing conditions by watershed, determine problem/concern areas, and suggest viable alternatives, including flood mitigation measures. This plan includes recommendations to update the City's drainage and stormwater regulations, which will include more aggressive detention standards, as well as retention requirements. The City anticipates working with all appropriate departments to implement coordinated and comprehensive drainage and flooding regulations during 2014. It is anticipated that these regulations will be adopted in 2015. The SWMP has suggested the creation of a Prioritization Plan for Voluntary Property Acquisition (Buyouts) and/or Floodproofing Program for Existing Buildings in the Special Flood Hazard Area (SFHA). The full SWMP can be found online at [www.cityofjeff.net](http://www.cityofjeff.net). The City of Jeffersonville will inform residents of the program when the voluntary program is implemented.

The City has adopted the 2008 Clark County Multi-Hazard Mitigation Plan (MHMP) which was developed to reduce or eliminate long-term risk to human life and property from hazards, including flooding. The plan was developed by River Hills EDD & RPC, which provides economic development and regional planning service support to the county, in conjunction with The Polis Center at Indiana University Purdue University Indianapolis and the Indiana Geological Survey at Indiana University. Emergency Management Agency personnel are primarily responsible for implementing the plan. The MHMP includes a risk assessment, hydrologic and hydraulic modeling, and computer-modeled flood hazard scenarios such as a levee failure using HAZUS-MH. The majority of flooding throughout Jeffersonville, not related to local drainage issues, is primarily due to the Ohio River, Silver Creek, Lick Run, and Lancassange Creek.

FEMA developed a *Flood Insurance Study and Flood Insurance Rate Map* for Clark County, which was published in August 2012. The study was required to update the Digital Flood Insurance Rate Maps (DFIRMS) which define the Special Flood Hazard Area (SFHA) floodplains of Jeffersonville. Hydrologic and hydraulic analyses were performed to establish peak discharge-frequency relationships and develop estimates on flood elevations. FEMA is currently reviewing a Letter of Map Revision (LOMR) which the City of Jeffersonville submitted to revise the preliminary DFIRMS. If accepted by FEMA, it will remove some buildings from the SFHA, which may include some buildings in the repetitive loss areas.



## Step 5. Document Findings

Based on the information reviewed, the following summary has been developed:

1. This is an isolated flood problem area, located in the Special Flood Hazard Area.
2. There are many actions property owners in the RL area can do to protect themselves, such as property protection measures, buying insurance coverage, and preparing an individual disaster plan.

The following table shows the addresses of properties within the RL area, foundation type, condition, and suggested mitigation measures:

Street Address	City, State, Zip Code	Foundation Type	Condition	Suggested Mitigation Measures*
2604 Bishop Road	Jeffersonville, IN 47130	Slab	Acceptable	Purchase/maintain flood insurance; re-grade landscape or install a small flood barrier system

\*Suggested mitigation measures prioritized in order of feasibility/viability.

## Action Items

The homeowner is primarily responsible for implementing the suggested mitigation measures, such as obtaining flood insurance, floodproofing, or regrading to divert flow away from buildings. To minimize damage to property or to avoid the burden of bearing the entire cost of cleanup and repair, it is suggested that personal property protection measures be implemented as soon as feasible. In an on-going basis, the City does provide on-site assistance to all properties throughout Jeffersonville. The City can provide educational materials regarding floodproofing alternatives, as well as ways to minimize risks from flooding events.

The City of Jeffersonville is continually seeking ways to reduce flooding throughout the community and will be researching grant funds to assist homeowners. If a grant is obtained, the funds will be made known to the community members as funds become available through a community outreach/enhancement project.

The City will continue to reference and implement strategies and projects outlined in the Stormwater Master Plan (2012) and other applicable studies if and when they are developed. Potential improvement strategies and community projects are outlined in this report that, when implemented, should decrease the risk of flooding in this area. As stated above, the City will be evaluating drainage ordinances and policies in 2014. Projects are implemented based on funding availability, overall number of properties benefiting, water quality benefits, quality of life enhancements, and other measurable actions.

## **Funding**

There are several possible sources of funding for mitigation projects:

The FEMA Flood Mitigation Assistance (FMA) program was created with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). Funds are provided to assist states and communities with implementing measures which reduce or eliminate the long-term risk of flood damage to buildings or other structures insured under the NFIP. Individual homeowners and businesses may not apply directly to the program, however, the City of Jeffersonville may apply on their behalf.

The types of FMA grants applicable to Jeffersonville are Planning Grants to prepare Flood Mitigation Plans and Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. More information may be found online at [www.fema.gov/flood-mitigation-assistance-program](http://www.fema.gov/flood-mitigation-assistance-program).

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To implement improvements recommended in the Stormwater Master Plan, Jeffersonville may rely on funding collected from the drainage user fee, the general revenues fund, and/or available grant dollars that may be available to implement these projects. (Note: Stormwater Master Plan funding is prioritized for projects. Prioritization criteria include number of properties impacted, severity of the issue, environmental benefit, and other measures).

## **Recommendations**

1. Residents should prepare for flooding by purchasing insurance coverage and preparing a disaster plan. Because the property is located in the Special Flood Hazard Area, a flood insurance policy is highly recommended.
2. The property which has suffered losses may elect to implement localized protection measures such as regrading the landscape or installing a flood barrier system to prevent water from reaching the building. (Note: Installations of such systems may require permitting. City officials will be able to provide information on permitting requirements.)
3. All buildings in the property could increase floodproofing protection measures along the building perimeters by diverting flows away from buildings, elevating heat-pumps, and relying on temporary barrier systems, where feasible.

4. The City should continue to enforce all regulations designed to prevent flooding from worsening. The City will evaluate ordinances (2014) for the opportunity to enhance detention and retention standards for development and redevelopment, in an effort to minimize urban runoff peak flows and volume.
5. The City should perform regular inspections and cleaning of the culvert under Bishop Road and its associated channel to prevent further blockages.
6. The City should continue to provide residents with information regarding opportunities to protect private properties from flood damage.
7. The City should provide annual reminders, information, references, and technical assistance to residents in repetitive loss areas.
8. The City should continue to implement enhancements outlined in the City's adopted Stormwater Master Plan

### **Future Report Maintenance**

The City will perform periodic evaluations of the overall implementation strategies and improvement projects identified in this RLAA report. As changes occur and both public and private improvements are made, it may be necessary and beneficial to reflect those modifications in these reports.

*These reports will be made available to property owners of the repetitive loss areas and other entities which may have projects that could impact drainage in the repetitive loss area.*

*Prepared for the City of Jeffersonville, Office of the City Engineer, City Hall, 500 Quartermaster Court, Jeffersonville, IN, 47130.*



**Repetitive Loss Area #5  
Seminole Drive**



**September 2013  
City of Jeffersonville**



# Repetitive Loss Area Analysis

## Repetitive Loss Area #5 – Seminole Drive

### Background

The Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP) is continually faced with the task of distributing funds for claims while trying to keep the price of flood insurance at an affordable level. Repetitive loss (RL) properties are of particular concern, which are estimated to cost \$200 million per year in flood insurance claim payments. An NFIP repetitive loss property is defined as a property where two or more flood insurance claims of more than \$1,000 have been paid within a 10-year period since 1978. Repetitive loss properties represent only one percent of all flood insurance policies, but historically they account for nearly one-third of the claim payments (over \$4.5 billion to date). There is constant pressure on the FEMA to increase flood insurance premium rates in order to keep the NFIP in its current self-supporting mode and to minimize the burden of flood damage on the general public. Mitigation of the flood risk to these repetitive loss properties will reduce the overall costs to the NFIP as well as to individual homeowners. It is the goal of this repetitive loss area analysis (RLAA) to examine causes of flooding and suggest mitigation measures, either for the city or the homeowner, to prevent future flooding damage.

Flooding has always been a major concern for the City of Jeffersonville, especially since it is located along the Ohio River. The City of Jeffersonville has a floodwall and levee system near the downtown area to help protect the City from Ohio River flooding. There have been two significant flood events in Jeffersonville in the past four years. The most recent was in April 2011 when the Ohio River flooded and the City closed a number of floodgates for the first time in many years. In September 2009, the Kentuckiana Flash Flood also inundated many areas of the City and caused widespread damage. The drainage conveyance system became overwhelmed and caused flooding throughout the City. Many of the historic insurance claims in the RL area also reflect the March 1997 Ohio River flood event. No study on flooding in Jeffersonville would be complete without mentioning The Great Flood of 1937 which is the worst flood on record and devastated the area.

At this time, Jeffersonville has 15 properties which are considered RL properties. The RLAA is, by definition, an *area* analysis, and examines not only the RL properties, but also nearby properties. To be considered an RL property, flood insurance is/was carried. However, other properties in the area may not have had insurance, so it is considered discriminatory for the local government to help only one property when other homes may be affected by the same problems.

This study is intended to assist the City of Jeffersonville with their flooding problems by examining areas which have a history of repetitive losses, and to suggest mitigation measures to correct the cause of the flooding or reduce property damage. Neither property values nor home insurance rates will be impacted as a result of being included in a RLAA report. In addition, a property considered to be in a repetitive loss area will not necessarily be required to carry flood insurance, although it is highly recommended.

## **Purpose**

The City of Jeffersonville, located in Clark County, Indiana, is currently pursuing enrollment in the NFIP Community Rating System (CRS) program which offers discounts on flood insurance premiums for residents. RLAA reports were determined to be beneficial in the City's CRS program initiatives.

## **Process**

This area analysis follows a FEMA-prescribed five-step process outlined in the *2013 CRS Coordinator's Manual*.

Step 1. Advise all the property owners in the repetitive loss areas that the analysis will be conducted.

Step 2. Collect data on each building and determine the cause(s) of the repetitive damage.

Step 3. Review alternative 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.

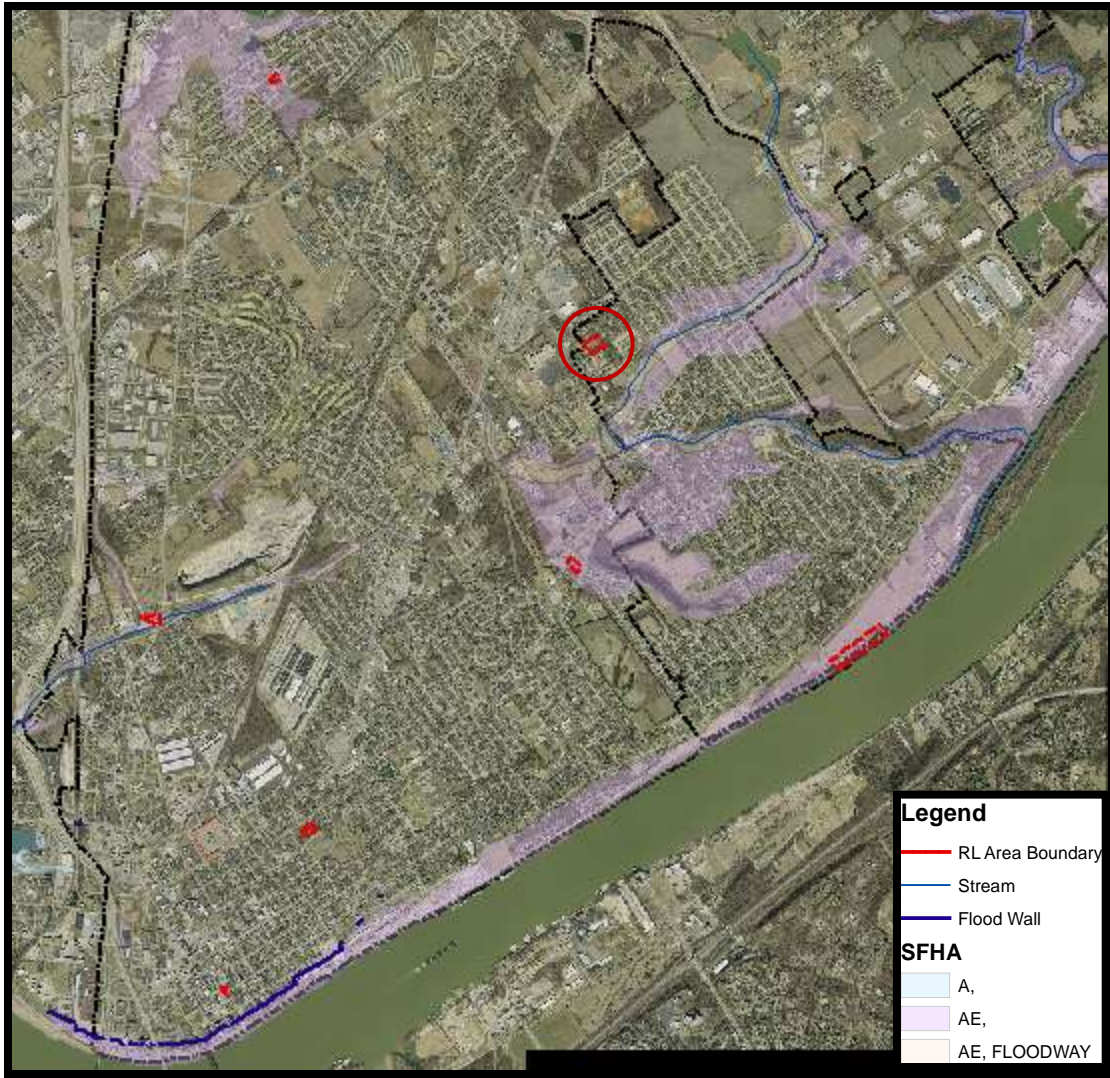
Step 5. Document the findings, including a map showing all properties in the area.

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## **Area Analysis:**

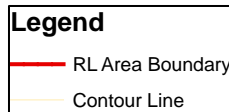
The Seminole Drive RL area contains one single-family residence. (See the following pages for maps of the location and area of analysis.) The home was constructed in 1960 and reported losses in 2011, 1997, 1996, 1991, and 1989. The surrounding buildings are also single-family homes, however, none are considered to be in the repetitive loss (RL) area due to their elevation and distances from drainage conveyances. This area is not located in the combined sewer overflow (CSO) area of Jeffersonville, nor is it located in a floodplain. It is located along a tributary and is less than a quarter mile from Lancassange Creek. The elevation of a portion of this property is lower than the surrounding areas, so the flooding issues are suspected to be due to stormwater runoff conditions. The property across the street to the northwest also has a portion of the lower yard that may flood, but the house is built on a higher elevation and has no history of flooding.

*Note:* The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data is used for floodplain management, mitigation, or research purposes. Therefore, this report does not intend to identify any specific NFIP repetitive loss properties or include claims information for any individual property.



Map 1: Map of southern portion of City of Jeffersonville. (Circled area designates Seminole Drive).





Map 2: Repetitive Loss Area Boundary along Seminole Drive.

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## Step 1: Neighborhood Notification

The first step in this process was to notify property owners in the study area about the analysis. Parcel property assessment reports were checked to identify the name and address of the owner of each property in the RL area. The City of Jeffersonville sent a notice to the all residents in the RL area, a copy of which has been included in the appendix.

## Step 2: Data Collection

The second step in the analysis process was to collect relevant data on the problem and the properties exposed to flooding. The sources of information used for this include flood insurance records, County parcel data, anecdotal evidence from local residents, on-site visual assessments, and existing studies relevant to the study area.



Flood insurance claims information was obtained from a FEMA representative specifically for Jeffersonville's RLAA reports. Some dates on the claims extend prior to 1980 and do not necessarily reflect the current exposure. However, many claims throughout Jeffersonville correspond to major flooding events which occurred in March 1997, August 2009, and April 2011. Parcel property assessment detail reports were obtained from the County's geographic information system (GIS) available on 39degreesnorth.com.

## Site Visit

A site visit was completed on August 16, 2013 by Stantec Consulting Services, Inc., as representatives of the City of Jeffersonville, to review site conditions associated with the apparent causes of flooding losses. Illustrative photos in this report were taken of properties in the study area, probable flooding sources, and already implemented flooding mitigation solutions used on the site.



Photo 1 – View repetitive loss property from Seminole Drive, facing southeast. Portions of front yard have been built-up to prevent runoff from entering the house.



Photo 2: View of lower-portion of the property which experiences the majority of the flooding.

## **Resident Input**

Stantec spoke with the owner of the property and a local resident who described the flooding conditions which occur during heavy rainfall events. Stormwater runoff has washed out the driveway, flooded the yard, and entered the basement in the past.

## **Apparent Cause of Flooding**

The source of flooding for Seminole Drive is stormwater runoff during heavy rain events. When the Lancassange Creek floods, it likely floods the tributary which leads to the property and causes flooding. Also, the resident of the neighborhood described increased drainage issues due to increased amounts of impervious surface from development further upstream in the watershed. However, improvements have been made in recent years to control the stormwater runoff from the developed sites which has reduced the amount of stormwater runoff entering the Seminole Drive RL area. The elevation of a portion of this property is lower than the surrounding areas, which causes flooding to occur on this property. Flooding mitigation measures have already been installed on the property in the form of re-grading the front yard to prevent water from flowing towards the house.

### **Step 3. Possible Mitigation Alternatives**

FEMA defines “mitigation” as “any sustained action taken to reduce or eliminate long term risk to life and property from a hazard event.” There are many ways to mitigate a repetitive flood problem. Controlling flood waters is only one possible consideration. Note that “mitigate” does not mean protect forever – it means doing what can be done to reduce the impact of flooding. Even large flood control levees and reservoirs only protect to a certain design level, and thus, they can also fail. Therefore, it’s important to review a full range of alternatives to reduce risk.

There are five general applicable approaches that are recommended by FEMA:

#### **1. Structural Projects**

Structural projects are built to control the flow of water and prevent it from reaching an area. They include levees, reservoirs, barrier systems, and conveyance system improvements. Structural projects are often least disruptive to residents, but can disrupt natural flows and habitats. In some cases, they may be cost-prohibitively expensive.

Possible structural measures that should be considered at this location to reduce stormwater runoff could include, but are not limited to:

- Evaluating the feasibility of constructing upstream detention or retention basins to control excess stormwater runoff along Lancassange Creek.

#### **2. Property Protection**

Property protection measures are undertaken by individual property owners on a building-by-building or parcel basis. They include building relocation, elevating the structure, retrofitting, sewer backflow protection, and obtaining flood insurance. The cost of each measure varies greatly.

Possible property protection measures that could be utilized in this area, beyond what has already been installed, could include, but is not limited to:

- Purchasing or maintaining the current flood insurance policy that will cover surface flooding. Although this measure will not reduce property damage, it will help the owner pay for cleanup and repairs caused by flooding.
- Elevate utilities, such as heating and air conditioning systems, water heaters, and other major appliances to higher floors.
- Wet floodproofing portions of the building so water won’t cause damage.
- Building a flood barrier system around the lower portion of the property to prevent water from entering the basement.

### **3. Preventative Activities**

Preventive activities are taken to reduce or prevent future construction from having a negative impact on the flood-prone area. The City of Jeffersonville manages this through planning, land acquisition, and development regulations. The City's stormwater management ordinance requires new developments to control their stormwater runoff so that peak flow of drainage is no greater than the conditions before the development was completed. In this area, the upstream watershed is currently undergoing development, so preventive activities should have a positive impact on this area in the future.

### **4. Emergency Measures**

In the event of a flood, emergency measures should be taken to minimize danger to persons and damage to property. While major emergency measures are the responsibility of the City or county emergency management staff, individual property owners can stay informed of weather warnings by listening to the National Weather Service NOAA Weather Radio. (See <http://www.nws.noaa.gov/nwr/>).

Jeffersonville has also recently implemented a voluntary constituent notification system for "smart-phone" owners called YourGOV. This software can be easily installed on "smart-phones," tablets, and other devices to notify residents and businesses about communitywide activities and initiatives. As the system matures and registration increases, the City will investigate opportunities to increase public awareness during emergency situations.

### **5. Public Information**

The City will be conducting an annual outreach project for repetitive loss areas to advise property owners and residents of the flood hazard and ways to protect people and property from flooding.

In addition, the City maintains a Floodplain Management webpage which is intended to inform residents about flood safety, flood insurance, and drainage system maintenance. (See <http://cityofjeff.net>).

## **Step 4. Summary of Agencies and Organizations Potentially Affecting the Causes or Impacts of Flooding**

The following agencies and organizations were contacted by Stantec, on behalf of Jeffersonville, throughout the development of the RLAA and CRS activities:

- FEMA Region V ISO/CRS Coordinator
- Jeffersonville Stormwater Coordinator
- Jeffersonville City Engineer
- River Hills EDD & RPC
- The Polis Center at Indiana University Purdue University Indianapolis
- French Wetmore, CFM of French & Associates, Ltd. (CRS Program Consultant)



- STARR – Strategic Alliance for Risk Reduction

**Flood Studies:** The following studies and reports were also obtained and reviewed for this RLAA report:

- City of Jeffersonville *Stormwater Master Plan (SWMP)*, December 2012 (Burke)
- City of Jeffersonville *Long-Term Control Plan (LTCP)*, 2009
- *Flood Insurance Study and Flood Insurance Rate Map* for Clark County and Incorporated Areas, FEMA, August 31, 2012
- *Clark County Multi-Hazard Mitigation Plan*, November 2008
- Jeffersonville/Clarksville Flood Control District, *Mill Creek and Cane Run Watershed Analysis*, May 2013 (Strand)
- Town of Clarksville, *Cane Run and Mill Creek Preliminary Drainage Study*, August 2012 (Stantec)

Christopher B. Burke Engineering, LLC developed a Stormwater Master Plan (SWMP) for the City of Jeffersonville, which was published in December 2012. The purpose of the SWMP was to examine the existing conditions by watershed, determine problem/concern areas, and suggest viable alternatives, including flood mitigation measures. This plan includes recommendations to update the City’s drainage and stormwater regulations, which will include more aggressive detention standards, as well as retention requirements. The City anticipates working with all appropriate departments to implement coordinated and comprehensive drainage and flooding regulations during 2014. It is anticipated that these regulations will be adopted in 2015. The SWMP has suggested the creation of a Prioritization Plan for Voluntary Property Acquisition (Buyout) and/or Floodproofing Program for Existing Buildings in the Special Flood Hazard Area (SFHA). The full SWMP can be found online at [www.cityofjeff.net](http://www.cityofjeff.net). The City of Jeffersonville will inform residents of the program when the voluntary program is implemented.

The City has adopted the Clark County Multi-Hazard Mitigation Plan (MHMP) which was developed to reduce or eliminate long-term risk to human life and property from hazards, including flooding. The plan was developed by River Hills EDD & RPC, which provides economic development and regional planning service support to the county, in conjunction with The Polis Center at Indiana University Purdue University Indianapolis and the Indiana Geological Survey at Indiana University. Emergency Management Agency personnel are primarily responsible for implementing the plan. The MHMP includes a risk assessment, hydrologic and hydraulic modeling, and computer-modeled flood hazard scenarios such as a levee failure using HAZUS-MH. The majority of flooding throughout Jeffersonville, not related to local drainage issues, is primarily due to the Ohio River, Silver Creek, Lick Run, and Lancassange Creek.

FEMA developed a *Flood Insurance Study and Flood Insurance Rate Map* for Clark County, which was published in August 2012. The study was required to update the Digital Flood Insurance Rate Maps (DFIRMs) which define the Special Flood Hazard Area (SFHA) floodplains of Jeffersonville. Hydrologic and hydraulic analyses were performed to establish peak discharge-frequency relationships and develop estimates on flood elevations. FEMA is currently reviewing a Letter of Map Revision (LOMR) which the City of Jeffersonville

submitted to revise the preliminary FIRMS. If accepted by FEMA, it will remove some buildings from the SFHA, which may include some buildings in the repetitive loss areas, however this is not related to this particular property.

## Step 5. Document Findings

Based on the information reviewed, the following summary has been developed:

1. This is an isolated flood problem area associated with stormwater runoff. This location is not in the Special Flood Hazard Area.
2. There are many actions the property owners can do to protect themselves beyond what has already been implemented. These actions may include property protection measures, buying insurance coverage, and preparing an individual emergency response plan.

The following table shows the addresses of properties within the RL area, foundation type, condition, and suggested mitigation measures:

Street Address	City, State, Zip Code	Foundation Type	Condition	Suggested Mitigation Measures*
3006 Seminole Drive	Jeffersonville, IN 47130	Basement	Acceptable	Purchase or maintain flood insurance; elevate utilities; wet floodproofing; install a flood barrier system around the lower portion of the property

\*Suggested mitigation measures prioritized in order of feasibility/viability.

## Action Items

The homeowner is primarily responsible for implementing the suggested mitigation measures, such as obtaining flood insurance, floodproofing, or regrading to divert flow away from buildings. To minimize damage to property or to avoid the burden of bearing the entire cost of cleanup and repair, it is suggested that personal property protection measures be implemented as soon as feasible. In an on-going basis, the City does provide on-site assistance to all properties throughout Jeffersonville. The City can provide educational materials regarding floodproofing alternatives, as well as ways to minimize risks from flooding events.

The City of Jeffersonville is continually seeking ways to reduce flooding throughout the community and will be researching grant funds to assist homeowners. If a grant is obtained, the funds will be made known to the community members as funds become available through a community outreach/enhancement project.

The City will continue to reference and implement strategies and projects outlined in the Stormwater Master Plan (2012). Potential improvement strategies and community projects are

outlined in this report that, when implemented, will decrease the risk of flooding in this area. As stated above, the City will be evaluating drainage ordinances and policies in 2014. Projects are implemented based on funding availability, overall number of properties benefiting, water quality benefits, quality of life enhancements, and other measurable actions.

## **Funding**

There are several possible sources of funding for mitigation projects:

The FEMA Flood Mitigation Assistance (FMA) program was created with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). Funds are provided to assist States and communities with implementing measures which reduce or eliminate the long-term risk of flood damage to buildings or other structures insured under the NFIP. Individual homeowners and businesses may not apply directly to the program, however, the City of Jeffersonville may apply on their behalf.

The types of FMA grants applicable to Jeffersonville are Planning Grants to prepare Flood Mitigation Plans and Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. More information may be found online at [www.fema.gov/flood-mitigation-assistance-program](http://www.fema.gov/flood-mitigation-assistance-program).

The FEMA Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The goal of the HMGP is to reduce loss of life and property due to natural disaster, such as flooding, and to assist communities in implementing mitigation measures immediately following a disaster. More information may be found online at [www.fema.gov/hazard-mitigation-grant-program](http://www.fema.gov/hazard-mitigation-grant-program).

To implement improvements recommended in the Stormwater Master Plan, Jeffersonville may rely on funding collected from drainage user fees, the general revenues fund, and/or available grant dollars that may be available to implement these projects. (Note: Stormwater Master Plan funding is prioritized for projects. Prioritization criteria include number of properties impacted, severity of the issue, environmental benefit, and other measures).

## **Recommendations**

1. Building owners should consider purchasing/maintaining flood insurance. Because the property is not located in the Special Flood Hazard Area, a flood insurance policy is less expensive.
2. The property owner should ensure utilities are elevated above floodwaters.
3. The building in the study area could increase floodproofing protection measures along the building perimeter by diverting flows away from buildings.

4. The City should continue to enforce all regulations designed to prevent flooding from worsening. The City will evaluate ordinances (2014) for the opportunity to enhance detention and retention standards for development and redevelopment, in an effort to minimize urban runoff peak flows and volume.
5. The City should continue to provide residents with information regarding opportunities to protect private properties from flood damage.
6. The City should provide annual reminders, information, references, and technical assistance to residents in repetitive loss areas and throughout the community.
7. The City should continue to implement enhancements outlined in the City's adopted Stormwater Master Plan.

### **Future Report Maintenance**

The City will perform periodic evaluations of the overall implementation strategies and improvement projects identified in this RLAA report. As changes occur and both public and private improvements are made, it may be necessary and beneficial to reflect those modifications in these reports.

*These reports will be made available to property owners of the repetitive loss areas and other entities which may have projects that could impact drainage in the repetitive loss area.*

*Prepared for the City of Jeffersonville, Office of the City Engineer, City Hall, 500 Quartermaster Court, Jeffersonville, IN, 47130.*





**Repetitive Loss Area #6  
Loma Vista Drive**



**September 2013  
City of Jeffersonville**

# Repetitive Loss Area Analysis

## Repetitive Loss Area #6 – Loma Vista Drive

### Background

The Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP) is continually faced with the task of distributing funds for claims while trying to keep the price of flood insurance at an affordable level. Repetitive loss (RL) properties are of particular concern, which are estimated to cost \$200 million per year in flood insurance claim payments. An NFIP repetitive loss property is defined as a property where two or more flood insurance claims of more than \$1,000 have been paid within a 10-year period since 1978. Repetitive loss properties represent only one percent of all flood insurance policies, but historically they account for nearly one-third of the claim payments (over \$4.5 billion to date). There is constant pressure on the FEMA to increase flood insurance premium rates in order to keep the NFIP in its current self-supporting mode and to minimize the burden of flood damage on the general public. Mitigation of the flood risk to these repetitive loss properties will reduce the overall costs to the NFIP as well as to individual homeowners. It is the goal of this repetitive loss area analysis (RLAA) to examine causes of flooding and suggest mitigation measures, either for the city or the homeowner, to prevent future flooding damage.

Flooding has always been a major concern for the City of Jeffersonville, especially since it is located along the Ohio River. The City of Jeffersonville has a floodwall and levee system near the downtown area to help protect the City from Ohio River flooding. There have been two significant flood events in Jeffersonville in the past four years. The most recent was in April 2011 when the Ohio River flooded and the City closed a number of floodgates for the first time in many years. In September 2009, the Kentuckiana Flash Flood also inundated many areas of the City and caused widespread damage. The drainage conveyance system became overwhelmed and caused flooding throughout the City. Many of the historic insurance claims in the RL area also reflect the March 1997 Ohio River flood event. No study on flooding in Jeffersonville would be complete without mentioning The Great Flood of 1937 which is the worst flood on record and devastated the area.

At this time, Jeffersonville has 15 properties which are considered RL properties. The RLAA is, by definition, an *area* analysis, and examines not only the RL properties, but also nearby properties. To be considered an RL property, flood insurance is/was carried. However, other properties in the area may not have had insurance, so it is considered discriminatory for the local government to help only one property when other homes may be affected by the same problems.

This study is intended to assist the City of Jeffersonville with their flooding problems by examining areas which have a history of repetitive losses, and to suggest mitigation measures to correct the cause of the flooding or reduce property damage. Neither property values nor home insurance rates will be impacted as a result of being included in a RLAA report. In addition, a property considered to be in a repetitive loss area will not necessarily be required to carry flood insurance, although it is highly recommended.

## Purpose

The City of Jeffersonville, located in Clark County, Indiana, is currently pursuing enrollment in the NFIP Community Rating System (CRS) program which offers discounts on flood insurance premiums for residents. RLAA reports were determined to be beneficial in the City's CRS program initiatives.

## Process

This area analysis follows a FEMA-prescribed five step process outlined in the *2013 CRS Coordinator's Manual*.

Step 1. Advise all the property owners in the repetitive loss areas that the analysis will be conducted.

Step 2. Collect data on each building and determine the cause(s) of the repetitive damage.

Step 3. Review alternative 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 a map showing all properties in the area.

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## Area Analysis

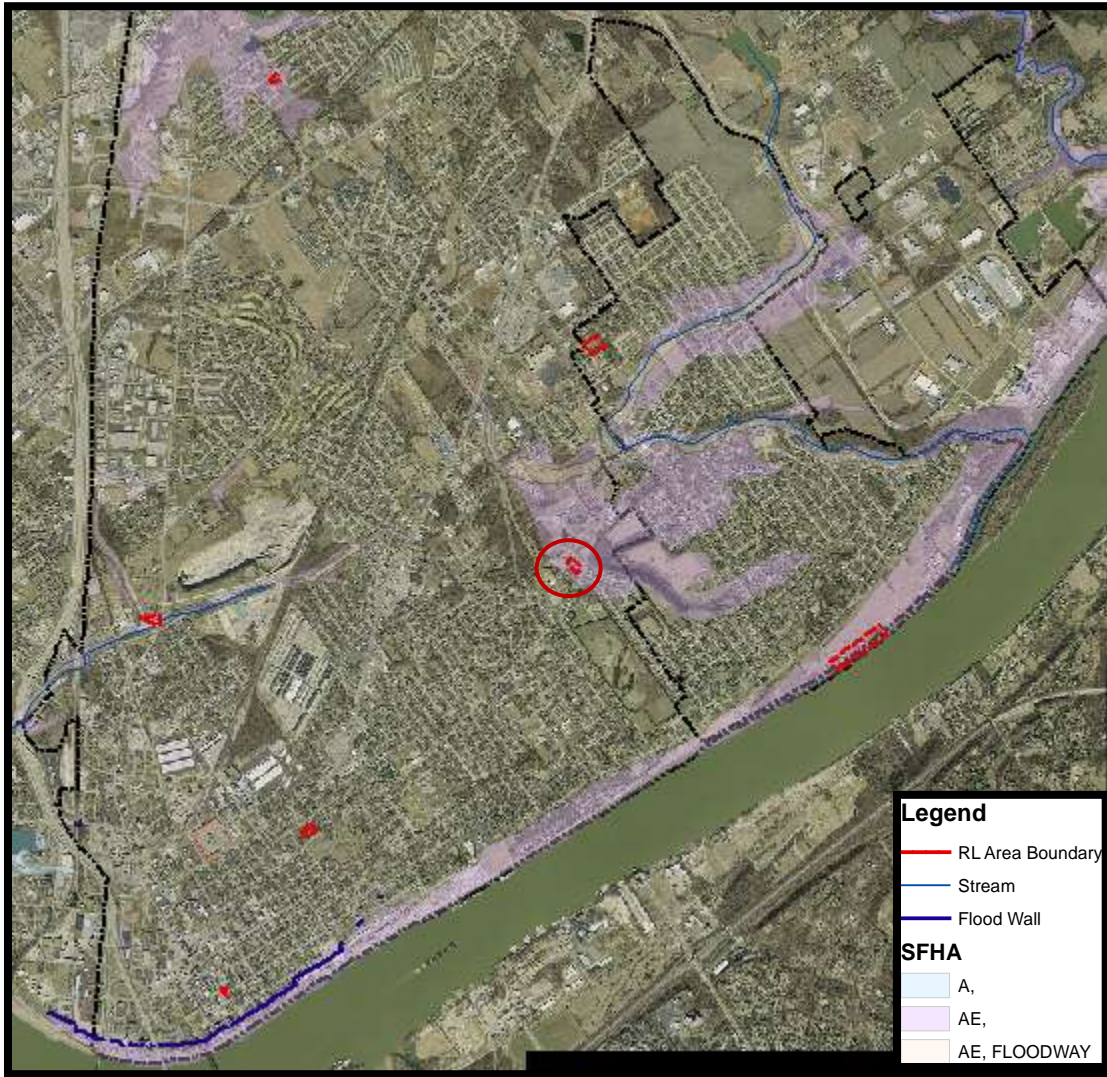
The Loma Vista Drive RL area is comprised of three residential properties. (See the following pages for maps of the location and area of analysis.) A single-family residential building was identified as having a history of flooding. Two other single-family home parcels located adjacent to this property were also included in the repetitive loss area. The repetitive loss (RL) property was constructed in 1957 and reported losses in 1997, 1989, and 1983, however, resident interviews revealed that the area has flooded as recently as 2009. This area is not located in the combined sewer overflow (CSO) section of Jeffersonville, but is located in a Special Flood Hazard Area (SFHA) regulatory floodplain. The elevation of these three properties is slightly lower than the surrounding areas and the flooding issues are suspected to be due to local drainage infrastructure capacity issues.

The two other buildings included in the RL area analysis were also constructed in 1957. These properties were included in the repetitive loss area because of their proximity and similar elevation to the RL property. A fourth parcel adjacent to the RL area on the NW side has been built-up approximately two feet to prevent water from flowing into the buildings and has therefore not been included in the current RL area.

*Note:* The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data is used for

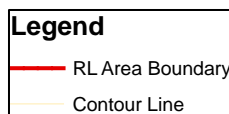


floodplain management, mitigation, or research purposes. Therefore, this report does not intend to identify any specific NFIP repetitive loss properties or include claims information for any individual property.



Map 1: Map of southern portion of City of Jeffersonville. (Circled area designates Loma Vista Drive).





Map 2: Repetitive Loss Boundary of Loma Vista Drive.

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## Step 1: Neighborhood Notification

The first step in this process was to notify property owners in the study area about the analysis. Parcel property assessment reports were checked to identify the name and address of the owner of each property in the RL area. The City of Jeffersonville sent a notice to the all residents in the RL area, a copy of which has been included in the appendix.

## Step 2: Data Collection

The second step in the analysis process was to collect relevant data on the problem and the properties exposed to flooding. The sources of information used for this include flood insurance records, County parcel data, anecdotal evidence from local residents, on-site visual assessments, and existing studies relevant to the study area.

Flood insurance claims information was obtained from a FEMA representative specifically for Jeffersonville's RLAA reports. Some dates on the claims extend prior to 1980 and do not necessarily reflect the current exposure. However, many claims throughout Jeffersonville correspond to major flooding events which occurred in March 1997, August 2009, and April 2011. Parcel property assessment detail reports were obtained from the County's geographic information system (GIS) available on 39degreesnorth.com.

## Site Visit

A site visit was completed on August 16, 2013 by Stantec Consulting Services, Inc., as representatives of the City of Jeffersonville, to review site conditions associated with the apparent causes of flooding losses. Illustrative photos in this report were taken of properties in the study area, probable flooding sources, and already implemented flooding mitigation solutions used on the site.



Photo 1: View of southern-most property from Loma Vista Drive, facing SW. The building to the left of the property is at a higher elevation and not considered to be part of the RL area.





Photo 2: Center property considered to be in the repetitive loss area.



Photo 3: View of northern-most property considered to be in the repetitive loss area.



Photo 4: Back view of southern-most property.



Photo 5: View of storm drain grate at the back of the RL area which becomes backed-up during heavy rainfall events and causes flooding.





Photo 6: Alternate view of the storm drain grate.



Photo 7: View of the northern property adjacent to the RL area which has been built-up to prevent flooding.

## **Resident Input**

Stantec was able to speak with a resident of the RL area who was helpful in describing the most recent flood conditions and extent of flooding, and pointed out the storm drain grate which overflows. He mentioned that his family has FEMA flood insurance, but would be grateful for the discount provided by the CRS program.

## **Apparent Cause of Flooding**

The source of flooding for Loma Vista Drive is likely a storm sewer system overflow during heavy rain events. The elevation of these properties is slightly lower than the surrounding areas, which leads to flooding of these properties. Flooding mitigation measures have already been installed on the northern property adjacent to the RL area in the form of building up the property two feet higher than surrounding properties.

## **Step 3. Possible Mitigation Alternatives**

FEMA defines “mitigation” as “any sustained action taken to reduce or eliminate long term risk to life and property from a hazard event.” There are many ways to mitigate a repetitive flood problem. Controlling flood waters is only one possible consideration. Note that “mitigate” does not mean protect forever – it means doing what can be done to reduce the impact of flooding. Even large flood control levees and reservoirs only protect to a certain design level, and thus, they can also fail. Therefore, it’s important to review a full range of alternatives to reduce risk.

There are five general applicable approaches that are recommended by FEMA:

### **1. Structural Projects**

Structural projects are built to control the flow of water and prevent it from reaching an area. They include levees, reservoirs, barrier systems, and conveyance system improvements. Structural projects are often least disruptive to residents, but can disrupt natural flows and habitats. In some cases, they may be cost-prohibitively expensive.

Possible structural measures that should be considered at this location to reduce stormwater runoff could include, but are not limited to:

- Evaluating and possibly upgrading the size of the receiving storm sewer system.
- Evaluate the feasibility of providing enhanced upstream detention.

### **2. Property Protection**

Property protection measures are undertaken by individual property owners on a building-by-building or parcel basis. They include building relocation, elevating the structure, retrofitting, sewer backflow protection, and obtaining flood insurance. The cost of each measure varies greatly.

Possible property protection measures that could be utilized in this area, beyond what has already been installed, could include, but is not limited to:

- Purchasing a flood insurance policy that will cover surface flooding. Although this measure will not reduce property damage, it will help the owners pay for cleanup and repairs caused by flooding.
- Regrading and landscaping the property so flood-waters cannot reach the buildings. This includes building up the property to prevent water from reaching the buildings, such as has been done on the northern property adjacent to the RL area.
- Building a small flood barrier system around the building to prevent water from reaching the home.
- Elevate utilities, such as heating and air conditioning systems, water heaters, and other major appliances, if possible.
- Wet floodproofing portions of the building so water won't cause extensive damage.

### **3. Preventative Activities**

Preventive activities are taken to reduce or prevent future construction from having a negative impact on the flood-prone area. The City of Jeffersonville manages this through planning, land acquisition, and development regulations. The City's stormwater management ordinance requires new developments to control their stormwater runoff so that peak flow of drainage is no greater than the conditions before the development was completed. In this area, the upstream watershed is already substantially developed, so preventive activities will have limited effect unless significant redevelopment occurs in the future.

### **4. Emergency Measures**

In the event of a flood, emergency measures should be taken to minimize danger to persons and damage to property. While major emergency measures are the responsibility of the City or county emergency management staff, individual property owners can stay informed of weather warnings by listening to the National Weather Service NOAA Weather Radio. (See <http://www.nws.noaa.gov/nwr/>). If a heavy rain alert is issued, individual property protection measures can be implemented.

Jeffersonville has also recently implemented a voluntary constituent notification system for "smart-phone" owners called YourGOV. This software can be easily installed on "smart-phones," tablets, and other devices to notify residents and businesses about communitywide activities and initiatives. As the system matures and registration increases, the City will investigate opportunities to increase public awareness during emergency situations.

### **5. Public Information**

As stated above, the City has started using an outreach and education program called YourGOV, which will be used in the future to educate and inform residents about various programs and activities that may be of benefit, including information on drainage and flooding.

The City will be conducting an annual outreach project for repetitive loss areas to advise property owners and residents of the flood hazard and ways to protect people and property from flooding.

In addition, the City maintains a Floodplain Management webpage which is intended to inform residents about flood safety, flood insurance, and drainage system maintenance. (See <http://cityofjeff.net>).

#### **Step 4. Summary of Agencies and Organizations Potentially Affecting the Causes or Impacts of Flooding**

The following agencies and organizations were contacted by Stantec, on behalf of Jeffersonville, throughout the development of the RLAA and CRS activities:

- FEMA Region V ISO/CRS Coordinator
- Jeffersonville Stormwater Coordinator
- Jeffersonville City Engineer
- River Hills EDD & RPC
- The Polis Center at Indiana University Purdue University Indianapolis
- French Wetmore, CFM of French & Associates, Ltd. (CRS Program Consultant)
- STARR – Strategic Alliance for Risk Reduction

**Flood Studies:** The following studies and reports were also obtained and reviewed for this RLAA report:

- City of Jeffersonville *Stormwater Master Plan (SWMP)*, December 2012 (Burke)
- City of Jeffersonville *Long-Term Control Plan (LTCP)*, 2009
- *Flood Insurance Study and Flood Insurance Rate Map* for Clark County and Incorporated Areas, FEMA, August 31, 2012
- *Clark County Multi-Hazard Mitigation Plan*, November 2008
- Jeffersonville/Clarksville Flood Control District, *Mill Creek and Cane Run Watershed Analysis*, May 2013 (Strand)
- Town of Clarksville, *Cane Run and Mill Creek Preliminary Drainage Study*, August 2012 (Stantec)

Christopher B. Burke Engineering, LLC developed a Stormwater Master Plan (SWMP) for the City of Jeffersonville, which was published in December 2012. The purpose of the SWMP was to examine the existing conditions by watershed, determine problem/concern areas, and suggest viable alternatives, including flood mitigation measures. This plan includes recommendations to update the City's drainage and stormwater regulations, which will include more aggressive detention standards, as well as retention requirements. The City anticipates working with all appropriate departments to implement coordinated and comprehensive drainage and flooding regulations during 2014. It is anticipated that these regulations will be adopted in 2015. The SWMP has suggested the creation of a Prioritization Plan for Voluntary Property Acquisition



(Buyouts) and/or Floodproofing Program for Existing Buildings in the Special Flood Hazard Area (SFHA). The full SWMP can be found online at [www.cityofjeff.net](http://www.cityofjeff.net). The City of Jeffersonville will inform residents of the program when the voluntary program is implemented.

The City has adopted the Clark County Multi-Hazard Mitigation Plan (MHMP) which was developed to reduce or eliminate long-term risk to human life and property from hazards, including flooding. The plan was developed by River Hills EDD & RPC, which provides economic development and regional planning service support to the county, in conjunction with The Polis Center at Indiana University Purdue University Indianapolis and the Indiana Geological Survey at Indiana University. Emergency Management Agency personnel are primarily responsible for implementing the plan. The MHMP includes a risk assessment, hydrologic and hydraulic modeling, and computer-modeled flood hazard scenarios such as a levee failure using HAZUS-MH. The majority of flooding throughout Jeffersonville, not related to local drainage issues, is primarily due to the Ohio River, Silver Creek, Lick Run, and Lancassange Creek.

FEMA developed a *Flood Insurance Study and Flood Insurance Rate Map* for Clark County, which was published in August 2012. The study was required to update the Digital Flood Insurance Rate Maps (DFIRMs) which define the Special Flood Hazard Area (SFHA) floodplains of Jeffersonville. Hydrologic and hydraulic analyses were performed to establish peak discharge-frequency relationships and develop estimates on flood elevations. FEMA is currently reviewing a Letter of Map Revision (LOMR) which the City of Jeffersonville submitted to revise the preliminary FIRMS. If accepted by FEMA, it will remove some buildings from the SFHA, which may include some buildings in the repetitive loss areas.

## Step 5. Document Findings

Based on the information reviewed, the following summary has been developed:

1. This is an isolated flood problem area associated with storm sewer drainage overflows. This location is in the Special Flood Hazard Area (SFHA).
2. There are many actions property owners in the RL area can do to protect themselves beyond what has already been implemented. These actions may include property protection measures, buying insurance coverage, and preparing an individual emergency response plan.

The following table shows the addresses of properties within the RL area, foundation type, condition, and suggested mitigation measures:

Street Address	City, State, Zip Code	Foundation Type	Condition	Suggested Mitigation Measures*
103 Loma Vista Drive	Jeffersonville, IN 47130	Crawlspace	Likely requires correction	Purchase/maintain flood insurance; floodproof exterior walls; re-grade surrounding landscape; elevate building

Street Address	City, State, Zip Code	Foundation Type	Condition	Suggested Mitigation Measures*
105 Loma Vista Drive	Jeffersonville, IN 47130	Crawlspace	Likely requires correction	Purchase/maintain flood insurance; floodproof exterior walls; re-grade surrounding landscape; elevate building
107 Loma Vista Drive	Jeffersonville, IN 47130	Crawlspace	Likely requires correction	Purchase/maintain flood insurance; floodproof exterior walls; re-grade surrounding landscape; elevate building

\*Suggested mitigation measures prioritized in order of feasibility/viability.

## Action Items

The homeowner is primarily responsible for implementing the suggested mitigation measures, such as obtaining flood insurance, floodproofing, or regrading to divert flow away from buildings. To minimize damage to property or to avoid the burden of bearing the entire cost of cleanup and repair, it is suggested that personal property protection measures be implemented as soon as feasible. In an on-going basis, the City does provide on-site assistance to all properties throughout Jeffersonville. The City can provide educational materials regarding floodproofing alternatives, as well as ways to minimize risks from flooding events.

The City of Jeffersonville is continually seeking ways to reduce flooding throughout the community and will be researching grant funds to assist homeowners. If a grant is obtained, the funds will be made known to the community members as funds become available through a community outreach/enhancement project.

The City will continue to reference and implement strategies and projects outlined in the Stormwater Master Plan (2012) and other applicable studies if and when they are developed. Potential improvement strategies and community projects are outlined in this report that, when implemented, should decrease the risk of flooding in this area. As stated above, the City will be evaluating drainage ordinances and policies in 2014. Projects are implemented based on funding availability, overall number of properties benefiting, water quality benefits, quality of life enhancements, and other measurable actions.

## Funding

There are several possible sources of funding for mitigation projects:

The FEMA Flood Mitigation Assistance (FMA) program was created with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). Funds are provided to assist states and communities with implementing measures which reduce or eliminate the long-term risk of flood damage to buildings or other structures insured under the NFIP. Individual

homeowners and businesses may not apply directly to the program, however, the City of Jeffersonville may apply on their behalf.

The types of FMA grants applicable to Jeffersonville are Planning Grants to prepare Flood Mitigation Plans and Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. More information may be found online at [www.fema.gov/flood-mitigation-assistance-program](http://www.fema.gov/flood-mitigation-assistance-program).

The FEMA Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The goal of the HMGP is to reduce loss of life and property due to natural disaster, such as flooding, and to assist communities in implementing mitigation measures immediately following a disaster. More information may be found online at [www.fema.gov/hazard-mitigation-grant-program](http://www.fema.gov/hazard-mitigation-grant-program).

To implement improvements recommended in the Stormwater Master Plan, Jeffersonville may rely on funding collected from the drainage user fee, the general revenues fund, and/or available grant dollars that may be available to implement these projects. (Note: Stormwater Master Plan funding is prioritized for projects. Prioritization criteria include number of properties impacted, severity of the issue, environmental benefit, and other measures).

## **Recommendations**

1. The properties in the repetitive loss area may elect to implement localized personalized protection measures such as the purchasing flood insurance or maintaining current flood insurance policy; elevate buildings on property; re-grade surrounding landscape to encourage floodwater to flow away from buildings; floodproof exterior walls; or installing a flood barrier system around portions of the property.
2. All buildings in the property could increase floodproofing protection measures along building perimeters by diverting flows away from buildings, elevating appliances, and relying on temporary barrier systems, where feasible.
3. Building owners should consider purchasing/maintaining flood insurance. Residents/occupants should consider purchasing/maintaining renters insurance for contents.
4. The City should continue to enforce all regulations designed to prevent flooding from worsening. The City will evaluate ordinances (2014) for the opportunity to enhance detention and retention standards for development and redevelopment, in an effort to minimize urban runoff peak flows and volume.
5. The City should continue to provide residents with information regarding opportunities to protect private properties from flood damage.
6. The City should provide annual reminders, information, references, and technical assistance to residents in repetitive loss areas.

7. The City should continue to implement enhancements outlined in the City's adopted Stormwater Master Plan.

### **Future Report Maintenance**

The City will perform periodic evaluations of the overall implementation strategies and improvement projects identified in this RLAA report. As changes occur and both public and private improvements are made, it may be necessary and beneficial to reflect those modifications in these reports.

*These reports will be made available to property owners of the repetitive loss areas and other entities which may have projects that could impact drainage in the repetitive loss area.*

*Prepared for the City of Jeffersonville, Office of the City Engineer, City Hall, 500 Quartermaster Court, Jeffersonville, IN, 47130.*





**Repetitive Loss Area #7  
Riverview Drive**



**September 2013  
City of Jeffersonville**

# Repetitive Loss Area Analysis

## Repetitive Loss Area #7 – Riverview Drive

### Background

The Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program (NFIP) is continually faced with the task of distributing funds for claims while trying to keep the price of flood insurance at an affordable level. Repetitive loss (RL) properties are of particular concern, which are estimated to cost \$200 million per year in flood insurance claim payments. An NFIP repetitive loss property is defined as a property where two or more flood insurance claims of more than \$1,000 have been paid within a 10-year period since 1978. Repetitive loss properties represent only one percent of all flood insurance policies, but historically they account for nearly one-third of the claim payments (over \$4.5 billion to date). There is constant pressure on the FEMA to increase flood insurance premium rates in order to keep the NFIP in its current self-supporting mode and to minimize the burden of flood damage on the general public. Mitigation of the flood risk to these repetitive loss properties will reduce the overall costs to the NFIP as well as to individual homeowners. It is the goal of this repetitive loss area analysis (RLAA) to examine causes of flooding and suggest mitigation measures, either for the city or the homeowner, to prevent future flooding damage.

Flooding has always been a major concern for the City of Jeffersonville, especially since it is located along the Ohio River. The City of Jeffersonville has a floodwall and levee system near the downtown area to help protect the City from Ohio River flooding. There have been two significant flood events in Jeffersonville in the past four years. The most recent was in April 2011 when the Ohio River flooded and the City closed a number of floodgates for the first time in many years. In September 2009, the Kentuckiana Flash Flood also inundated many areas of the City and caused widespread damage. The drainage conveyance system became overwhelmed and caused flooding throughout the City. Many of the historic insurance claims in the RL area also reflect the March 1997 Ohio River flood event. No study on flooding in Jeffersonville would be complete without mentioning The Great Flood of 1937 which is the worst flood on record and devastated the area.

At this time, Jeffersonville has 15 properties which are considered RL properties. The RLAA is, by definition, an *area* analysis, and examines not only the RL properties, but also nearby properties. To be considered an RL property, flood insurance is/was carried. However, other properties in the area may not have had insurance, so it is considered discriminatory for the local government to help only one property when other homes may be affected by the same problems.

This study is intended to assist the City of Jeffersonville with their flooding problems by examining areas which have a history of repetitive losses, and to suggest mitigation measures to correct the cause of the flooding or reduce property damage. Neither property values nor home insurance rates will be impacted as a result of being included in a RLAA report. In addition, a property considered to be in a repetitive loss area will not necessarily be required to carry flood insurance, although it is highly recommended.

## **Purpose**

The City of Jeffersonville, located in Clark County, Indiana, is currently pursuing enrollment in the NFIP Community Rating System (CRS) program which offers discounts on flood insurance premiums for residents. RLAA reports were determined to be beneficial in the City's CRS program initiatives.

## **Process**

This area analysis follows a FEMA-prescribed five step process outlined in the *2013 CRS Coordinator's Manual*.

Step 1. Advise all the property owners in the repetitive loss areas that the analysis will be conducted.

Step 2. Collect data on each building and determine the cause(s) of the repetitive damage.

Step 3. Review alternative 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 a map showing all properties in the area.

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## **Area Analysis**

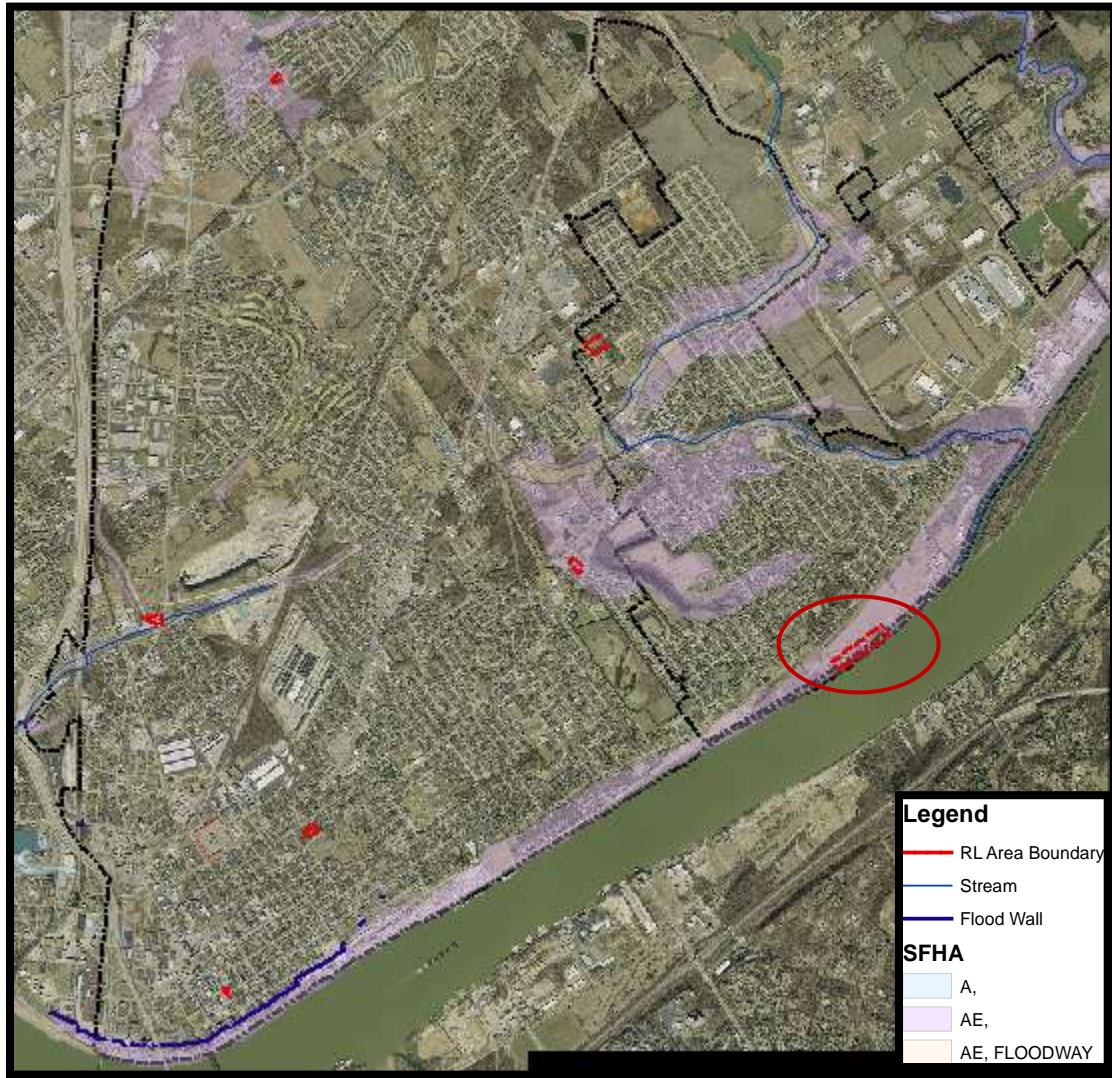
A total of 23 parcels containing 19 residences are included in the Riverview Drive RL area. (See the maps on the following two pages for the location and area of analysis.) This area immediately adjoins the Ohio River and is highly susceptible to flooding. There is no flood protection system (floodwalls, levees, etc.) for this area. Eight single-family residential homes were identified as having a history of flooding. The entrance road, Riverview Drive, is located approximately 200 feet from the river, and the buildings are located 150 feet from the river, on average. This area is not located in the combined sewer overflow (CSO) section of Jeffersonville, however it is located in the Ohio River floodplain. All buildings in the RL area are elevated to varying extents, with one structure approximately at grade with wet floodproofing measures employed. Wet floodproofing practices are used to varying extents in other buildings throughout the area.

The repetitive loss properties were constructed between 1960 and 1990 and many homes reported losses in 2011, 2005, 1997, 1996, 1994, 1991, and 1989.

The eleven non-repetitive loss residential buildings included in the area analysis were constructed between 1926 and 1981, however, most were constructed after 1970. There are four lots which do not have permanent structures on them.

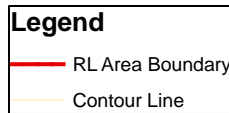


*Note:* The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data is used for floodplain management, mitigation, or research purposes. Therefore, this report does not intend to identify any specific NFIP repetitive loss properties or include claims information for any individual property.



Map 1: Map of southern portion of City of Jeffersonville. (Circled area designates Riverview Drive).





Map 2: Repetitive Loss Boundary of Riverview Drive.

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## Step 1: Neighborhood Notification

The first step in this process was to notify property owners in the study area about the analysis. Parcel property assessment reports were checked to identify the name and address of the owner of each property in the RL area. The City of Jeffersonville sent a notice to the all residents in the RL area, a copy of which has been included in the appendix.

## Step 2: Data Collection

The second step in the analysis process was to collect relevant data on the problem and the properties exposed to flooding. The sources of information used for this include flood insurance records, County parcel data, anecdotal evidence from local residents, on-site visual assessments, and existing studies relevant to the study area.

Flood insurance claims information was obtained from a FEMA representative specifically for Jeffersonville's RLAA reports. Some dates on the claims extend prior to 1980 and do not necessarily reflect the current exposure. However, many claims throughout Jeffersonville correspond to major flooding events which occurred in March 1997, August 2009, and April 2011. Parcel property assessment detail reports were obtained from the County's geographic information system (GIS) available on 39degreesnorth.com.

## Site Visit

A site visit was completed on August 16, 2013 by Stantec Consulting Services, Inc., as representatives of the City of Jeffersonville, to review site conditions associated with the apparent causes of flooding losses. Illustrative photos in this report were taken of properties in the study area, probable flooding sources, and already implemented flooding mitigation solutions used on the site.



Photo 1: View of northeastern-most property from Riverview Drive with Ohio River in the background. (Building is a duplex and considered as two separate parcels for insurance purposes.)





Photo 2: Building view from Riverview Drive.



Photo 3: View of at-grade building from Riverview Drive.



Photo 4: View of a from Riverview Drive.



Photo 5: View of property from Riverview Drive.





Photo 6: View of property from Riverview Drive.



Photo 7: View of property from Riverview Drive.



Photo 7: Access road from Riverview Drive to Utica Pike, facing NW. Road becomes impassable during flood events which limits emergency response measures.

## **Resident Input**

Stantec was able to speak with one member of the repetitive loss area who described the difficulties which she continued to face as a result of the 2011 flood event. She also described how the access road from Riverview Drive to Utica Pike becomes flooded when the Ohio River floods, which compromises the safety of local residents.

## **Apparent Cause of Flooding**

The source of flooding for Riverview Drive is directly related to the Ohio River flood events. The elevation of these properties is significantly lower than the nearby areas since they are located in the Ohio River floodplain. Flooding mitigation measures have already been installed on most of the properties in the form elevating the structures. A number of residents have employed wet floodproofing practices.

## **Step 3. Possible Mitigation Alternatives**

FEMA defines “mitigation” as “any sustained action taken to reduce or eliminate long term risk to life and property from a hazard event.” There are many ways to mitigate a repetitive flood problem. Controlling flood waters is only one possible consideration. Note that “mitigate” does not mean protect forever – it means doing what can be done to reduce the impact of flooding.

Even large flood control levees and reservoirs only protect to a certain design level, and thus, they can also fail. Therefore, it's important to review a full range of alternatives to reduce risk.

There are five general applicable approaches that are recommended by FEMA:

### **1. Structural Projects**

Structural projects are built to control the flow of water and prevent it from reaching an area. They include levees, reservoirs, barrier systems, and conveyance system improvements. Structural projects are often least disruptive to residents, but can disrupt natural flows and habitats. In some cases, they may be cost-prohibitively expensive.

Possible structural measures that should be considered at this location to reduce stormwater runoff could include, but are not limited to:

- No public/municipal projects are feasible for implementation that would substantially reduce property flooding from the Ohio River.

### **2. Property Protection**

Property protection measures are undertaken by individual property owners on a building-by-building or parcel basis. They include building relocation, elevating the structure, retrofitting, sewer backflow protection, and obtaining flood insurance. The cost of each measure varies greatly.

Possible property protection measures that could be utilized in this area, beyond what has already been installed, could include, but is not limited to:

- Purchasing or maintaining a flood insurance policy that will cover surface flooding. Although this measure will not reduce property damage, it will help the owners pay for cleanup and repairs caused by flooding. Renters can also purchase coverage for the contents of the home, even if the building owner does not purchase insurance for the building itself.
- Elevate utilities, such as heating and air conditioning systems, water heaters, and other major appliances to higher floors.
- Wet floodproofing portions of the building so water won't cause extensive damage.
- Elevating homes above the current elevated height to reduce flood damage. It is suggested that the floor elevation be at or above the base flood elevation (BFE).
- For the non-elevated property, consider elevating the structure to reduce instances of flood damage.

### **3. Preventive Activities**

Preventive activities are taken to reduce or prevent future construction from having a negative impact on the flood-prone area. The City of Jeffersonville manages this through planning, land acquisition, and development regulations. The City's stormwater management ordinance requires

new developments to control their stormwater runoff so that peak flow of drainage is no greater than the conditions before the development was completed. In this area, the upstream watershed is essentially at full build-out, so preventive activities will have limited use except for redevelopments in the future.

#### **4. Emergency Measures**

In the event of a flood, emergency measures should be taken to minimize danger to persons and damage to property. While major emergency measures are the responsibility of the City or county emergency management staff, individual property owners can stay informed of weather warnings by listening to the National Weather Service NOAA Weather Radio. (See <http://www.nws.noaa.gov/nwr/>). If a heavy rain alert is issued, individual property protection measures can be implemented, such as installing the door on the floodwall or other openings.

Jeffersonville has also recently implemented a voluntary constituent notification system for “smart-phone” owners called YourGOV. This software can be easily installed on “smart-phones,” tablets, and other devices to notify residents and businesses about communitywide activities and initiatives. As the system matures and registration increases, the City will investigate opportunities to increase public awareness during emergency situations.

#### **5. Public Information**

The City will be conducting an annual outreach project for repetitive loss areas to advise property owners and residents of the flood hazard and ways to protect people and property from flooding.

In addition, the City maintains a Floodplain Management webpage which is intended to inform residents about flood safety, flood insurance, and drainage system maintenance. (See <http://cityofjeff.net>).

### **Step 4. Summary of Agencies and Organizations Potentially Affecting the Causes or Impacts of Flooding**

The following agencies and organizations were contacted by Stantec, on behalf of Jeffersonville, throughout the development of the RLAA and CRS activities:

- FEMA Region V ISO/CRS Coordinator
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- STARR – Strategic Alliance for Risk Reduction



**Flood Studies:** The following studies and reports were also obtained and reviewed for this RLAA report:

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Christopher B. Burke Engineering, LLC developed a Stormwater Master Plan (SWMP) for the City of Jeffersonville, which was published in December 2012. The purpose of the SWMP was to examine the existing conditions by watershed, determine problem/concern areas, and suggest viable alternatives, including flood mitigation measures. The plan outlines a series of structural (system improvements, new projects, regional basins, etc.) and non-structural projects (mitigation measures, regulatory updates, preventive measures, funding strategies, buyouts, etc.). This plan includes recommendations to update the City's drainage and stormwater regulations, which will include more aggressive detention standards, as well as retention requirements. The City anticipates working with all appropriate departments to implement coordinated and comprehensive drainage and flooding regulations during 2014. It is anticipated that these regulations will be adopted in 2015. The SWMP has suggested the creation of a Prioritization Plan for Voluntary Property Acquisition (Buyout) and/or Floodproofing Program for Existing Buildings in the Special Flood Hazard Area (SFHA). The full SWMP can be found online at [www.cityofjeff.net](http://www.cityofjeff.net). The City of Jeffersonville will inform residents of the program when the voluntary program is implemented.

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currently reviewing a Letter of Map Revision (LOMR) which the City of Jeffersonville submitted to revise the preliminary FIRMS. If accepted by FEMA, it will remove some buildings from the SFHA, which may include some buildings in the repetitive loss areas.

## Step 5. Document Findings

Based on the information reviewed, the following summary has been developed:

1. This location is in the Special Flood Hazard Area along the banks of the Ohio River in an area prone to flooding.
2. There are many actions property owners in the RL area can do to protect themselves beyond what has already been implemented. These actions may include property protection measures, buying insurance coverage, and preparing an individual emergency response plan.

The following table shows the addresses of properties within the RL area, foundation type, condition, and suggested mitigation measures (Note: As stated above, some mitigation measures may have already been implemented, including elevating structures, floodproofing exterior walls and floors, and barrier wall systems and flow diversion measures.+):

Street Address	City, State, Zip Code	Foundation Type used to Elevate Structure	Condition of Lower Portion of Structure	Suggested Mitigation Measures*
3314 B Riverview Drive	Jeffersonville, IN 47130	Masonry block	Acceptable; used for storage	Purchase or maintain flood insurance; elevate building; floodproof walls and floors
3314 A Riverview Drive	Jeffersonville, IN 47130	Masonry block	Acceptable; used for storage	Purchase or maintain flood insurance; elevate building; floodproof walls and floors
3312 Riverview Drive	Jeffersonville, IN 47130	Concrete	Acceptable;	Purchase or maintain flood insurance; elevate building; floodproof walls and floors;
3310 Riverview Drive	Jeffersonville, IN 47130	Concrete	Acceptable;	Purchase or maintain flood insurance; elevate building; floodproof walls and floors; elevate utilities to second floor
3308 Riverview Drive	Jeffersonville, IN 47130	Concrete	Acceptable;	Purchase or maintain flood insurance; elevate building; floodproof walls and floors; elevate utilities to second floor
3306 Riverview	Jeffersonville, IN 47130	No structure	N/A	N/A

Street Address	City, State, Zip Code	Foundation Type used to Elevate Structure	Condition of Lower Portion of Structure	Suggested Mitigation Measures*
Drive				
3304 Riverview Drive	Jeffersonville, IN 47130	Concrete walls and piers	Unable to assess; appears to be used for storage	Purchase or maintain flood insurance; elevate building; floodproof walls and floors
3302 Riverview Drive	Jeffersonville, IN 47130	Concrete walls and steel posts	Unable to assess; appears to be used for storage	Purchase or maintain flood insurance; elevate building; floodproof walls and floors
3220 Riverview Drive	Jeffersonville, IN 47130	Concrete walls and steel/concrete posts	Unable to assess; appears to be used for storage	Purchase or maintain flood insurance; elevate building; floodproof walls and floors;
3218 Riverview Drive	Jeffersonville, IN 47130	Vacant lot	Vacant lot	N/A
3216 Riverview Drive	Jeffersonville, IN 47130	Masonry walls on slab (wet floodproofed; appears used for storage)	Unable to assess	Purchase or maintain flood insurance; elevate building; floodproof walls and floors
3212 Riverview Drive	Jeffersonville, IN 47130	Masonry block walls with steel posts	Acceptable;	Purchase or maintain flood insurance; elevate building; floodproof walls and floors; elevate utilities to second floor
3210 Riverview Drive	Jeffersonville, IN 47130	Concrete walls and posts	Acceptable;	Purchase or maintain flood insurance; elevate building; floodproof walls and floors; elevate utilities to second floor
3208 Riverview Drive	Jeffersonville, IN 47130	Masonry block and steel posts	Unable to assess;	Purchase or maintain flood insurance; elevate building; floodproof walls and floors; elevate utilities to second floor
Riverview Drive (Riverside 1)	Jeffersonville, IN 47130	Piers / columns	Acceptable	Purchase or maintain flood insurance; elevate building; floodproof walls and

Street Address	City, State, Zip Code	Foundation Type used to Elevate Structure	Condition of Lower Portion of Structure	Suggested Mitigation Measures*
Lot 12)				floors; elevate utilities to second floor
Riverview Drive (Riverside AC Lot 11)	Jeffersonville, IN 47130	Piers / columns	Acceptable	Purchase or maintain flood insurance; elevate building; floodproof walls and floors;
3120 Riverview Drive	Jeffersonville, IN 47130	Piers / columns	Acceptable	Purchase or maintain flood insurance; elevate building; floodproof walls and floors;
3118 Riverview Drive	Jeffersonville, IN 47130	N/A (structure is open porch)	N/A	N/A
Riverview Drive (Riverside Acres Lot 8)	Jeffersonville, IN 47130	Vacant lot	Vacant lot	N/A
3112 Riverview Drive	Jeffersonville, IN 47130	Concrete walls and piers	Acceptable	Purchase or maintain flood insurance; elevate building; floodproof walls and floors; elevate utilities to second floor
Riverview Drive (Riverside Acres Lot 5)	Jeffersonville, IN 47130	Masonry block and piers	Acceptable	Purchase or maintain flood insurance; elevate building; floodproof walls and floors; elevate utilities to second floor
3110 Riverview Drive	Jeffersonville, IN 47130	Masonry block	Acceptable;	Purchase or maintain flood insurance; elevate building; floodproof walls and floors; elevate utilities to second floor
3102 Riverview Drive	Jeffersonville, IN 47130	Masonry block and piers	Acceptable	Purchase or maintain flood insurance; elevate building; floodproof walls and floors; elevate utilities to second floor

\*Suggested mitigation measures prioritized in order of feasibility/viability.



## **Action Items**

The homeowner is primarily responsible for implementing the suggested mitigation measures, such as obtaining flood insurance, floodproofing, or regrading to divert flow away from buildings. To minimize damage to property or to avoid the burden of bearing the entire cost of cleanup and repair, it is suggested that personal property protection measures be implemented as soon as feasible. In an on-going basis, the City does provide on-site assistance to all properties throughout Jeffersonville. The City can provide educational materials regarding floodproofing alternatives, as well as ways to minimize risks from flooding events.

The City of Jeffersonville is continually seeking ways to reduce flooding throughout the community and will be researching grant funds to assist homeowners. If a grant is obtained, the funds will be made known to the community members as funds become available through a community outreach/enhancement project.

The City will continue to reference and implement strategies and projects outlined in the Stormwater Master Plan (2012). Potential improvement strategies and community projects are outlined in this report that, when implemented, will decrease the risk of flooding in the City. However, flooding in this area is solely influenced by the Ohio River. As stated above, the City will be evaluating drainage ordinances and policies in 2014. Projects are implemented based on funding availability, overall number of properties benefiting, water quality benefits, quality of life enhancements, and other measurable actions.

## **Funding**

There are several possible sources of funding for mitigation projects:

The FEMA Flood Mitigation Assistance (FMA) program was created with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). Funds are provided to assist States and communities with implementing measures which reduce or eliminate the long-term risk of flood damage to buildings or other structures insured under the NFIP. Individual homeowners and businesses may not apply directly to the program, however, the City of Jeffersonville may apply on their behalf.

The types of FMA grants applicable to Jeffersonville are Planning Grants to prepare Flood Mitigation Plans and Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. More information may be found online at [www.fema.gov/flood-mitigation-assistance-program](http://www.fema.gov/flood-mitigation-assistance-program).

The FEMA Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The goal of the HMGP is to reduce loss of life and property due to natural disaster, such as flooding, and to assist communities in implementing mitigation measures immediately following a disaster. More information may be found online at [www.fema.gov/hazard-mitigation-grant-program](http://www.fema.gov/hazard-mitigation-grant-program).

To implement improvements recommended in the Stormwater Master Plan, Jeffersonville may rely on funding collected from drainage user fees, the general revenues fund, and/or available grant dollars that may be available to implement these projects. (Note: Stormwater Master Plan funding is prioritized for projects. Prioritization criteria include number of properties impacted, severity of the issue, environmental benefit, and other measures).

## **Recommendations**

1. The properties which have already installed structural improvements should continue to implement localized protection measures such as floodproofing walls and floors, installing barriers across building entrances, and maintaining elevated living spaces.
2. Properties in the study area could increase floodproofing protection measures along building perimeters by installing wet or dry floodproofing measures, elevating appliances, and relying on temporary barrier systems, where feasible.
3. Building owners should consider purchasing/maintaining flood insurance. Residents/occupants should consider purchasing/maintaining renters insurance for contents.
4. The City should continue to enforce all regulations designed to prevent flooding from worsening, as well as limiting development in floodplain areas. The City will evaluate ordinances (2014) for the opportunity to enhance detention and retention standards for development and redevelopment, in an effort to minimize urban runoff peak flows and volume.
5. The City should continue to provide residents with information regarding opportunities to protect private properties from flood damage.
6. The City should provide annual reminders, information, references, and technical assistance to residents in repetitive loss areas and throughout the community.
7. The City should continue to implement enhancements outlined in the City's adopted Stormwater Master Plan.

## **Future Report Maintenance**

The City will perform periodic evaluations of the overall implementation strategies and improvement projects identified in this RLAA report. As changes occur and both public and private improvements are made, it may be necessary and beneficial to reflect those modifications in these reports.

*These reports will be made available to property owners of the repetitive loss areas and other entities which may have projects that could impact drainage in the repetitive loss area.*

*Prepared for the City of Jeffersonville, Office of the City Engineer, City Hall, 500 Quartermaster Court, Jeffersonville, IN, 47130.*



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MIKE MOORE  
MAYOR

August 13, 2013

**REPETITIVE FLOODING AREA SURVEY**

**RE:** City of Jeffersonville Repetitive Flooding Survey

Dear Resident:

The City of Jeffersonville is evaluating various alternatives to help reduce the risk of flooding problems throughout the City. Your property is located in a region that has a history of flooding and flood-related problems. The City of Jeffersonville is exploring various strategies that may help property owners reduce adverse effects from flooding.

As part of this effort, a team from our consultant, Stantec Consulting Services Inc., will be collecting data on your property. This will involve a visual survey of your property. They will not need to go into the building, but they may need to photograph your property. The survey team will be in your area during the day between August 15<sup>th</sup> – 20<sup>th</sup>.

If you are home, the consultant team may ask you questions about flooding or drainage issues related to your property. We would appreciate your cooperation as they gather information. Please note, however, that you are not required to be home during this process.

**It is the intent of the City of Jeffersonville to develop preliminary recommendations for mitigation measures which may reduce future flood damage to your property.**

The information gathered from this visual survey will be used to develop a Repetitive Loss Area Analysis, in which preliminary recommendations will be made to help reduce flooding on your property. A copy of this report will be made available to you within three months. We appreciate your comments and cooperation throughout this process.

If you have any questions regarding this work or require clarification on any issue, please contact me at 812/280-3885 or 502/337-1502.

Sincerely,

Deb Ashack  
Stormwater Coordinator, City of Jeffersonville