2023 Louisville-Jefferson County Substantial Damage Management Plan

msd
Safe, clean waterways

Contents

Appendices

INTRODUCTION

As a member of the National Flood Insurance Program, Louisville Metro is required to evaluate substantially damaged properties following any hazardous event, such as flooding, wind storms, fires, and other events that cause damage to a structure. As the administering agency for Louisville Metro Government's Floodplain Management Ordinance, the Louisville & Jefferson County Metropolitan Sewer District (MSD) has prepared this Substantial Damage Plan to identify potentially vulnerable structures and plan for post-event actions should the structures be substantially damaged. This plan also outlines mitigation methods that could be applied to these at-risk areas to proactively reduce flood damage.

Structures that are located in the Federal Emergency Management Agency (FEMA) Special Flood Hazard Area and/or the Local Regulatory Floodplain are subject to substantial damage regulations. Portions of the Local Regulatory Floodplain lie outside of the Special Flood Hazard Area. The Local Regulatory Floodplain is an area designated as future floodplain based on anticipated development. The Special Flood Hazard Areas are mapped based on the existing land use at the time the flood model is completed. Substantial damage requirements are defined in the Louisville Metro Floodplain Ordinance.

This plan was submitted to the Louisville Metro Council on [give date] by the Louisville MSD Floodplain Manager via email. This plan is available for transmittal to the FEMA Regional Office, Region IV and to the Kentucky Division of Water NFIP State Coordinating Office if requested.

REGULATORY AND LEGISLATIVE AUTHORITY

Louisville Metro has adopted substantial damage regulations through their Floodplain Management Ordinance and, as their administering agency, Louisville MSD closely tracks cumulative substantial damage and substantial improvement over a one-year rolling period.

Louisville Metro's Substantial Damage language is established and defined in Louisville Metro's Floodplain Management Ordinance Chapter 157 adopted in 2017 and amended in 2022. Specifically, the ordinance defines the following terms and responsibilities:

> *ADMINISTERING AGENCY. The Louisville and Jefferson County Metropolitan Sewer District*
>
> *REPETITIVE LOSS. A structure that has incurred flood-related damages on two or more occasions during a ten-year rolling period. When a structure covered by a Standard Flood Insurance Policy under the NFIP sustains a flood-related loss and the Commonwealth of Kentucky and/or the administering agency declares the structure to be substantially or repetitively damaged, increased cost of compliance coverage (ICC) will help pay for a portion of the cost to elevate, floodproof, demolish, or remove the structure.*
>
> *SUBSTANTIAL DAMAGE. Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred, as determined by the administering agency and/or the Commonwealth of Kentucky.*
>
> *SUBSTANTIAL IMPROVEMENT. Any combination of repairs, reconstruction, alteration, additions or improvements to existing development not related to damage taking place during a one-year rolling period in which the cumulative cost equals or exceeds 50% of the market value of the structure, excluding periodic maintenance and upkeep (including without limitation, windows, doors and roofing) that does not increase the value of the structure. (See definition for Market Value.) With regard to damage, Substantial Improvement shall mean any combination of repairs, reconstruction, rehabilitation or improvement to existing development taking place during a one-year rolling period in which the cumulative cost equals or exceeds 50% of the market value of the structure. The cost of repairs, reconstruction, alteration, additions or improvements shall reflect the value in the marketplace of the labor and materials to be used. The first alteration of any wall, ceiling, floor or other structural part of the structure constitutes beginning of construction of the substantial improvement whether or not that alteration affects the external dimensions of the structure. The term does not include the cost of flood proofing or elevating a structure or any portion thereof to the freeboard elevation. This term does not apply to:*
>
> > *(1) Any project for improvement of a building required to comply with existing health, safety or sanitary code requirements which have been identified by the Code Enforcement Official and which are solely necessary to assure safe living conditions; or*

(2) Any alternation of a "historic structure" as defined in this chapter, provided that the alteration will not preclude the structure's continued designation as a "historic structure" and provided that mitigation measures to minimize future flood damages are used to the maximum extent practicable when historic structures are renovated or when repaired following a floor or other hazard event.

Section C of the Ordinance explains when permits are required. Requirements differ based on building use type. These requirements are listed below for residential projects, non-residential projects and critical facilities:

(C)(1) Floodplain Permit. No person shall begin development in the local regulatory floodplain unless and until a floodplain permit has been issued by the administering agency.

(C)(2) Required Issuance. The administering agency shall issue a floodplain permit for:

(a) Development, not including critical facilities, for use as a residence:

1. *Consisting of new construction or substantial improvement or repair of substantial damage where the lowest floor including the basement, if any, mechanical and utility equipment and ductwork is elevated at least to freeboard elevation*

(b) Development, other than a critical facility, for all other uses:

1. *Where the lowest floor including basement, if any, and all mechanical and utility equipment and ductwork are elevated at least to freeboard elevation, or*
2. *Where development consists of new construction or substantial improvement or repair of substantial damage where the portion of the new construction or substantial improvement or repair of substantial damage below freeboard elevation is floodproofed so that those areas including all mechanical and utility equipment and ductwork below the required elevation are watertight with walls substantially impermeable to the passage of water and structural components are used which have the capability to resist hydrostatic and hydrodynamic loads and the effects of buoyancy which capabilities shall be certified by a licensed professional engineer or architect and provided to the administering agency.*

(c) Development for critical facilities.

1. *A critical facility consisting of substantial improvement or repair of substantial damage so long as it meets the other requirements of subsections (C)(2)(b)1. and (C)(2)(b)2., above, provided that the lowest floor, including the basement, if any, mechanical and utility equipment and ductwork, is elevated at least to freeboard elevation and it has at least one access road capable of supporting a vehicle weighing 12,500 pounds which road is connected to land outside the local regulatory floodplain and the top of which road is no lower than freeboard elevation.*

ASSESSMENT OF VULNERABILITY TO SUBSTANTIAL DAMAGE

The Louisville area has been subject to flooding for thousands of years. Low-lying land along the Ohio River is covered frequently in the winter and spring. Ohio River floods typically occur over days or weeks and waters rise relatively slowly. Louisville is also prone to flash flooding from interior streams. Heavy rains can cause intense flash flooding along local streams and in areas with inadequate drainage systems. Flash floods can also occur due to a dam or levee failure. Large expanses of flatlands, lowlands and former swamplands can be quick to flood and slow to drain. Flash flooding often occurs over a short period of time, sometimes in just a few minutes.

Ohio River Flooding in 2021 near the Water Tower on River Road

Flooding History

Newspaper accounts and historical records show that during the 19th century large Ohio River floods occurred in 1832, 1847, 1859, 1867, 1882, 1883, and 1884. Major floods in the 20th and 21st centuries have occurred in 1907, 1913, 1933, 1937, 1943, 1945, 1948, 1961, 1962, 1964, 1997, and 2018. Thus, it can be seen that serious flooding has occurred in the Louisville area on the average of about once every 10 years. A summary of the top 10 historic river crests is presented in the table below.

In 1937, the worst Ohio River flood in history covered 60 percent of the City of Louisville and 65 square miles of Jefferson County outside the old city limits. About 23,000 people were evacuated. Damages totaled more than $1 billion in today's dollars. The 1937 flood prompted the construction of the Ohio River Flood Protection System. Started in 1948, it took nearly 40 years to complete. The floodwall stretches for 29 miles from northeastern Louisville Metro to the southwest, protecting about 110 square miles from Ohio River flooding. Sixteen pumping stations move stormwater from the protected area into the river.

McAlpine Locks and Dam Upper Gauge Ohio River Historic Crests		
Rank	**Height**	**Date**
1	52.15	01/27/1937
2	42.10	03/08/1945
3	41.70	02/16/1884
4	41.20	03/12/1964
5	39.50	02/16/1883
6	39.40	04/02/1913
7	38.76	03/07/1997
8	36.40	01/22/1907
9	36.00	04/19/1948
10	35.72	02/26/2018

Louisville Metro is prone to flash flooding throughout the year and the major flash flooding problem is related to out-of-bank flash flooding. Out-of-bank flooding is defined as flooding that occurs when the natural embankments of a watercourse are breached. Additionally, ponding also may result in certain areas at low elevations. The community is also vulnerable to other flooding situations due to street runoff, erosion, and sewer and drainage problems, as well as potential flooding due to a dam or levee failure.

Substantial Damage Tracking

All development, including repair of flood damage, within the local regulatory floodplain is required to have a local flood permit prior to the start of construction. MSD tracks floodplain permits in the Infor Public Sector (IPS) Program by address and date. Permit applications for alterations, additions, repairs or improvements to an existing structure require the submittal of a property value assessment or appraisal as well as the proposed and cumulative construction costs. Any combination of repairs, reconstruction, rehabilitation or improvements to an existing structure may not equal or exceed 50% of the market value of the structure during a one-year rolling period unless the building is brought into compliance with the current floodplain ordinance requirements (i.e. first floor and all mechanical and electrical equipment is elevated to freeboard elevation, installation of vents, etc).

Prior Substantial Damage

Louisville Metro has a long history of flooding from the Ohio River and its tributaries. A summary of prior substantial damage determinations is listed below.

Several homes along Eifler Beach Rd experienced flooding from the Ohio River with prolonged periods of submersion in 2011. These homes were determined to be substantially damaged and were demolished.

One structure in east Louisville was elevated by the property owner using Increased Cost of Compliance (ICC) funding assistance after being determined to be substantially damaged due to the flash flooding of Long Run Creek in 2013.

Two single-family homes in the Riviera Subdivision were determined to be substantially damaged by Ohio River flooding occurring in 2011 and 2015. Due to this determination, a FEMA buyout grant was applied for and they were later purchased through the grant program.

The Preston Park Area experienced flash flooding from Guardian Creek in 2006, 2009, 2013 and 2015. Numerous residential properties were declared substantially damaged following the 2015 flood and were demolished through an MSD funded buyout program.

Home along Eifler Beach Road substantially damaged in 2011 Ohio River Flood

The Broadmoor Park Subdivision Area experienced flash flooding from Buechel Branch in 2006, 2009, 2013 and 2015. Several residential properties were declared substantially damaged following the 2015 flood and were demolished through an MSD funded buyout program.

The Whispering Hills Subdivision Area experienced flash flooding from Fern Creek in 2006, 2009, 2013 and 2015. Multiple residential properties were declared substantially damaged following the 2015 flood and were demolished through an MSD funded buyout program. One structure was elevated by the property owner using ICC funding assistance.

One home located on Abbotts Beach Rd was determined to be substantially damaged from Ohio River flooding in 2018 and was demolished.

Properties Vulnerable to Substantial Damage

In an effort to be more proactive in selecting sites for mitigation, MSD completed a flood prioritization project in 2016. This project used estimated the first-floor elevations (FFE) of primary structures located in the Federal Emergency Management Agency (FEMA) Special Flood Hazard Area and the Local Regulatory Floodplain to determine depth of flooding and rank flood prone areas to prioritize buyout grant applications. In 2022, this FFE data set was updated to include primary structures added to the floodplain with the adoption of 2021 FEMA map updates for a total of 6,992 structures in the Special Flood Hazard Area. First floor

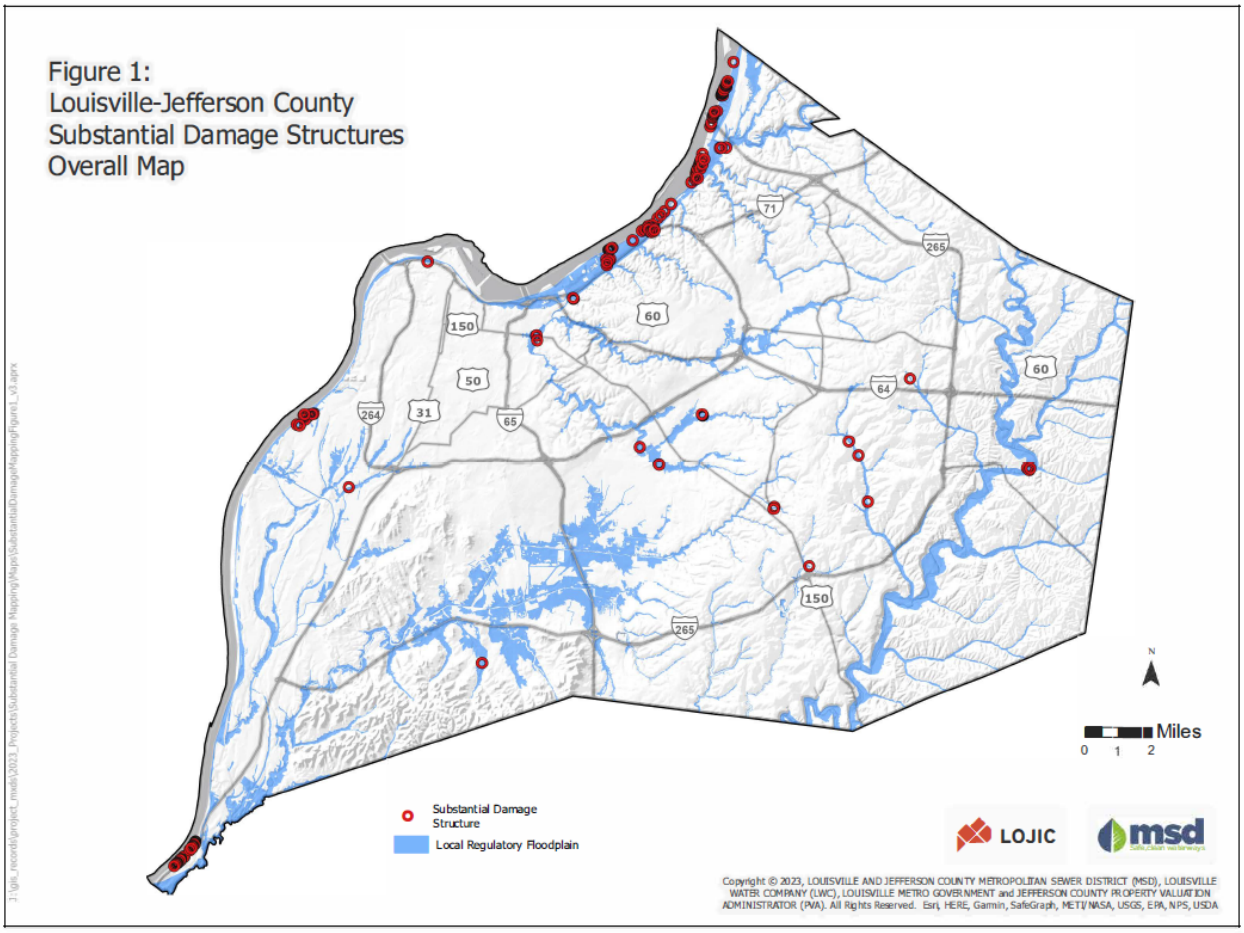
elevation data and flooding depths generated by this project were used to establish potential substantial damage areas of focus.

Vulnerable substantial damage property determinations were made by first identifying the structure characteristics based on available Property Valuation Administrator (PVA) data for value, square footage, construction type, number of floors and basement. First floor elevations were then compared to base flood elevations for the 1% annual chance flood event and plotted against the Army Corps of Engineers (USACE) Depth-Damage Relationship Tables for structures with[1] and without basements[2] as appropriate. A copy of the USACE Depth-Damage Relationship Tables used are included in Appendix A. Based on this analysis, any structure experiencing greater than a 40% damage for the 1% annual chance flood event was included in the preliminary potential substantial damage properties list. Each structure on this list was then investigated individually to verify if it would be prone to substantial damage or if additional available information such as field conditions or an elevation certificate would remove it from the list. The value of 40% damage was used instead of 50% as a more conservative value to account for unknowns, such as future climate change and the 1-year cumulative substantial damage/improvement requirement.

Figure 1 identifies the structures most likely to experience substantial damage. Those areas most affected include single family residential properties on roadways directly abutting the Ohio River in the floodway and conveyance zone followed by pockets of areas impacted by stream flash flooding. Information for these structures was used to populate the Substantial Damage Estimator (SDE) tool.

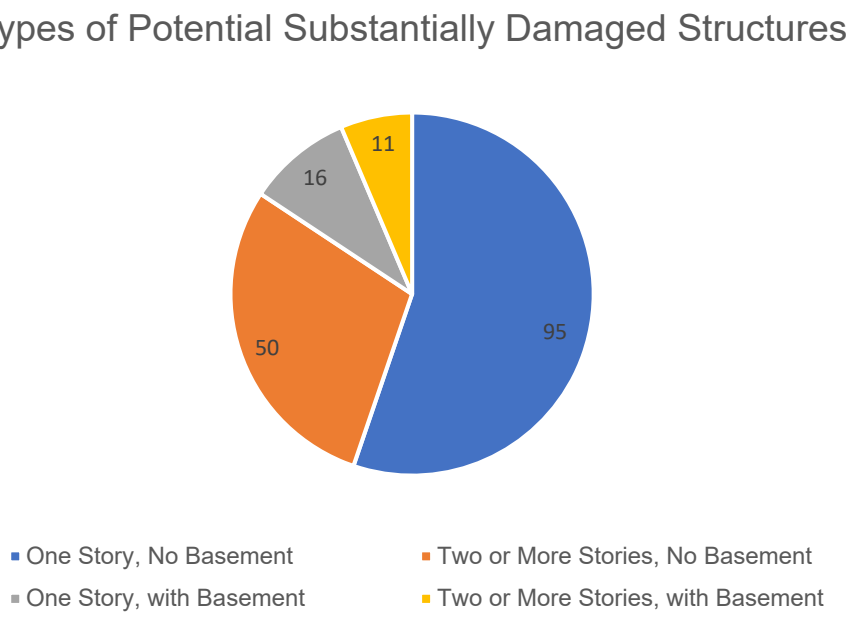
[1] United States Army Corps of Engineers. (2003) *Economic Guidance Memorandum 04-01 Generic Depth-Damage Relationships for Residential Structures with Basements*.

[2] United States Army Corps of Engineers. (2000) *Economic Guidance Memorandum 01-03 Generic Depth-Damage Relationships for Residential Structures without Basements.*



One hundred seventy-two buildings were determined to likely experience substantial damage in Louisville Metro. Of the 172 potentially substantially damaged buildings, 149 are residential and 23 are non-residential. Eighty seven percent (150 buildings) are located within the Ohio River floodplain, with the remaining 22 properties subject to flash flooding along a tributary. More than half of the properties (95) are 1-story structures with no basement. The remaining structures include 50 structures that are 2-story with no basement, 16 structures that are 1-story with a basement, and 11 structures that are 2-story structures with a basement. Due to privacy concerns, the list of potentially substantial damages properties has not been included in the report.

In addition to the Federal Emergency Management Agency (FEMA) Special Flood Hazard Area, floodplain permitting requirements and substantial improvement limitations also apply to structures in the Local Regulatory Floodplain. Portions of the Local Regulatory Floodplain lie outside of the Special Flood Hazard Area. The Local Regulatory Floodplain is an area designated as future floodplain based on anticipated development. Repetitive Loss structures would only be evaluated for potential substantial damage if they are located in the Special Flood Hazard Area or Local Regulatory Floodplain since the substantial damage regulations only apply in those areas.



The potential substantial damage structures list and map will be reviewed and updated annually by the Louisville MSD Floodplain Department at the time of the Annual Evaluation Report on the Substantial Damage Management Plan. Any mitigated structures will be removed and the list and map will be updated if new or revised flood information becomes available.

SUBSTANTIAL DAMAGE MANAGEMENT TEAM

Louisville Metro's Floodplain Management Ordinance Chapter 157 adopted on August 25, 2017, and amended in 2021, identifies MSD as the Administering Agency regulating and enforcing development in the floodplain. Any substantial improvement or repair of substantial damage may only be made in conformity with the provisions of the Floodplain Management Ordinance. Any combination of repairs, reconstruction, rehabilitation, or improvement to an existing structure may not equal or exceed 50% of the market value of the structure during a one-year rolling period.

Primary Substantial Damage Team and Responsibilities

The following MSD staff have primary responsibility for post-disaster response:

- MSD Floodplain Program Manager – Oversee Floodplain Department staff and give final approval for any properties deemed to be substantially damaged. Conduct field reviews for permit applications as needed to verify repairs and level of damage are in accordance with the floodplain ordinance.
- MSD Floodplain Engineering Staff – Identify areas that may be affected based on available rain and river gauge data, as well as field reconnaissance and customer requests. Work with inspectors to field verify and target outreach in these areas. Provide additional support for the review and issuance of permits for flood repairs as needed. Conduct field reviews for permit applications as needed to verify repairs and level of damage are in accordance with the floodplain ordinance.
- MSD Permitting Staff – Review and issue permits for flood repairs.
- MSD Inspectors – Field verify and identify structures in need of permits for repairs. Place door hangers and outreach materials as appropriate to notify of the need to request a permit for repairs.
- MSD Floodplain Enforcement – Field verify repair work is conducted in accordance with permits, consult with permittees on corrective actions needed to comply with permit and issue notices of violation as needed. Issue stop work orders for unpermitted work within the floodplain.
- MSD Communications Department – Provide updated outreach materials regarding flood cleanup safety and the need for permits via website, local and social media.

Louisville-Jefferson County will also make use of the MSD Development Review Team to conduct damage determinations after a damaging event if needed.

Additional Support Staff

In response to a major flood event, the MSD Emergency Preparedness & Operations Resiliency Administrator will be available to assist in damage determinations. Consultants can also be utilized as needed.

Louisville Metro Construction Review is responsible for issuing building permits and will communicate with MSD when an application is made for a site requiring a floodplain permit.

Louisville Metro Health Department will inform the public of health precautions or health related safety instructions for the general public.

Large Event Assistance

As outlined in The Louisville/Jefferson County Metro Government Emergency Operations Plan[3], the Louisville/Jefferson County Emergency Management Agency will serve as the lead agency in the preparation of an initial damage assessment following a severe rainfall event. Additionally, all agencies located within Louisville/Jefferson County, especially fire, police and public works, are responsible for reporting operational information, reports from the public, and observed damage to the Emergency Operations Center via windshield surveys. The Louisville/Jefferson County Metro Damage Assessment Coordinator (Building Department Director) assigns teams, backed-up with out-of-county mutual aid, to perform a “structure by structure” damage assessment. The Louisville/Jefferson County Metro PVA provides analysis support for damage assessment.

[3] Louisville Metro Emergency Services. (2022). *The Louisville Jefferson County Metro Government Emergency Operations Plan.*

POST-FLOOD ACTIONS

Communication and Coordination

MSD Floodplain Engineering department staff will attend trainings related to substantial damage topics and updates offered at the Kentucky Association of Mitigation Managers (KAMM) or Association of State Floodplain Managers (ASFPM) annual conferences. Should this training not be available, training will be supplemented by attending online courses or webinars offered by FEMA, the National Flood Insurance Program (NFIP), Kentucky Division of Water or other relevant groups. Floodplain Engineering department staff will provide training to additional team members as needed.

The MSD Floodplain Program Manager will provide an annual update to the Louisville Metro Council on MSD's management of substantial damage, its regulations, and the procedures in place to administer and enforce the regulations. These updates will occur in the spring of each year and will be distributed along with updates for the Program for Public Information, Coverage Improvement Plan and Flood Response Preparations. Notification will occur by email with floodplain engineering staff available to answer any questions on these documents.

Updates to this plan and annual evaluation reports are available for transmittal to the FEMA Regional Office, Region 4 and to the Kentucky NFIP State Coordinating Office from the MSD Floodplain Program Manager.

Louisville MSD informs its residents and property owners about vulnerability to and mitigation of substantial damage through:

- Annual floodplain newsletter mailed to every owner with property in the Special Flood Hazard Area or Local Regulatory Floodplain
- Handouts related to permitting requirements and Increased Cost of Compliance (ICC) funds

Examples of these outreach activities can be found in Appendix B.

Substantial Damage Determination Process

River gauge data and rainfall gauges used to determine the flood elevation reached during a flood event. This elevation is then used to estimate the depth of flooding in vulnerable structures and resulting anticipated damage percentage. This will streamline determining hotspots within flooded areas. This data is supplemented by determinations of uninhabitable structures received from the Louisville Emergency Management Agency and customer calls received from flooded properties. After large events, highwater marks may also be collected to help determine flood elevations. This data will also be checked against the SDE database to identify any hotspots within flooded areas.

Letters are sent to flooded areas advising residents of the need for and requirements of a permit for repairs. This letter also provides information regarding flood safety and clean up issues, ways to protect their property, flood insurance availability, permitting requirements and available Increased Cost of Compliance (ICC) funds from FEMA, should a structure be substantially damaged. An example of this letter is provided in Appendix C.

Louisville MSD will ensure that properties are visually inspected and preliminary damage estimates made within 10 days of the request for a permit to repair a suspected substantially damaged structure.

A floodplain permit is required for work on any structure in the floodplain. Louisville Metro Construction Review is responsible for issuing building permits and will communicate with MSD when an application is made for a site requiring a floodplain permit. Floodplain department staff and inspectors place door hangers on damaged properties to remind owners of the need to request a floodplain permit for repairs.

When a floodplain permit application is submitted, the owner is required to submit a contractor's itemized estimate for the cost of improvements along with the building value based on the current PVA value or an owner-provided appraisal. Floodplain department staff shall perform a field inspection to verify the repair activities in the estimate are complete and the costs are reasonably adequate for the work proposed. The cost to repair the damaged structure to its pre-damaged condition is compared to the market value. If the proposed work and any previous work equals or exceeds 50% of the market value for the current one-year rolling period, then it is determined to constitute repair of substantial damage. This determination is reviewed and approved by the MSD Floodplain Program Manager and formal notification is sent to the property owner.

The "market value" of damaged structures is defined as the appraised value of the structure as determined by a certified general real property appraiser licensed and certified by the Kentucky Real Estate Appraisers Board or lacking that, the current assessment of the structure shown by the PVA of Jefferson County, prior to the start of the addition, repair or improvement, or in the case of damage, prior to the damage's occurrence. If an appraisal is not provided by the property owner, the current PVA value will be documented by Floodplain Department staff.

Any other pertinent data needed for damage determinations such as owner information will obtained from PVA records. Building data will also be obtained from the PVA and will be field verified as needed. Depth of flooding will be determined from site inspections.

As necessary, Louisville MSD will notify property owners that a substantial damage determination will be required to take place at the time of request for permit.

The owners of buildings determined to be substantially damaged will be notified of the determination by letter and Floodplain Department staff will be available to address questions. Any substantial damage determinations are filed electronically. An example of a substantial damage determination letter is included as Appendix D.

Louisville Metro's Substantial Damage regulations are established and defined in the City's Floodplain Management Ordinance Chapter 157 adopted in 2017 and are tracked through the MSD Floodplain Permitting process.

If the property owner fails to comply with permitting requirements for improvements including substantial damage determinations, Louisville MSD's enforcement personnel will issue a Notice of Violation to the person responsible for the violation and/or the owner of the property, stating the facts of the offense or violation, the section of this chapter and/or the permit violated, when it occurred, how the violation is to be remedied to bring the development into conformity with this chapter or with the approved permit, and within what period of time the remedy is to occur, which period of time shall be reasonable and shall be determined by the nature of the violation and whether or not it creates a nuisance or hazard. The remedy may include an order to stop work on the development.

In the event the requested remedies and corrective actions are not taken, a Notice of Citation will be issued stating the violation, prior notices of violation issued, how the violation is to be remedied to bring the development into conformity with the ordinance requirements or with the approved permit and within what period of time the remedy is to occur and what penalty or penalties are recommended. When a citation is issued, the person to whom the citation is issued shall respond to the citation within seven days of the date the citation is issued by either carrying out the remedies and corrections set forth in the citation, paying the civil fine set forth in the citation or requesting a hearing before the Floodplain Board. If the person to whom the citation is issued does not respond to the citation within seven days, that person shall be deemed to have waived the right to a hearing and the determination that a violation occurred shall be considered final. In that event, the citation shall be presented to the Floodplain Board, and it shall enter its decision without a hearing.

If the person to whom the citation is issued requests a hearing before the Floodplain Board, the Floodplain Board shall schedule the hearing within 14 days unless all parties mutually agree to a continuance. The Floodplain Board shall take all testimony under oath and may subpoena alleged violators, witnesses, and evidence to its hearing. Any person not appearing at a duly scheduled hearing shall be deemed to have waived the right to a hearing and the Floodplain Board may enter its final decision. The Floodplain Board shall hear the evidence presented and based thereon shall render its decision and final order, which may uphold the citation, dismiss it, order remedies and corrective action or a monetary penalty or some combination thereof.

The maximum monetary penalties shall not exceed $500 for each day the violation has occurred with a maximum not to exceed $50,000 for each violation if the person who committed the offense contests the citation. If the person who committed the violation does not contest the citation, the civil monetary fine shall not exceed $300 for each day the violation has occurred with a maximum not to exceed $30,000 for each violation.

The final order of the Floodplain Board may be appealed to the Circuit Court of Jefferson County within 30 days of the date that it is issued. If the final order is not appealed within 30 days of its issuance, it shall be deemed final and unappealable.

Property owners who wish to dispute a substantial damage determination may submit additional information to document cost of repairs or home value. For example, the owner may submit an appraisal to document home value or more detailed construction estimates to validate costs. If the property is still deemed to be substantial damage, a written appeal of the decision can be sent to the Director of Development and Stormwater Services and a response will be received within 14 calendar days.

PROPERTY DATABASE & FEMA SUBSTANTIAL DAMAGE ESTIMATOR

Vulnerable substantial damage property determinations were made by first identifying the structure characteristics based on available Property Valuation Administrator (PVA) data for value, square footage, construction type, number of floors and basement. First floor elevations were then compared to base flood elevations for the 100-year flood event and plotted against the Army Corps of Engineers (USACE) Depth-Damage Relationship Table appropriate for the building type. Based on this analysis, any structure experiencing greater than a 50% damage for the 100-year flood event was included in the preliminary potential substantial damage properties list. Each structure on this list was then investigated individually to verify if it would be prone to substantial damage or if additional available information such as field conditions or elevation certificate would remove it from the list.

Necessary data was assembled initially in an excel spreadsheet. This data was then used to propagate a GIS map and complete FEMA's SDE template. Floodplain staff converted this excel file into the appropriate format for and entered the data into FEMA's SDE software.

The list was compiled by MSD floodplain staff and reviewed by the MSD Floodplain Manager to ensure all properties were included in the SDE database. The SDE database will be updated annually by MSD floodplain staff. Due to the sensitive nature of this information, individual information by address has not been included within this report.

Data used to determine potentially substantially damaged properties included: address, parcel number, latitude/longitude, FIRM zone, BFE, first floor elevation data, structure use (residential or commercial), total structure square footage, number of stories, and if there is a basement.

Data was obtained from the Louisville/Jefferson County Information Consortium (LOJIC) GIS data and supplemented with information available from the Louisville Metro and Jefferson County Property Valuation Administrator (PVA) office.

Additional data is not required at this time to populate the substantial damage database; however, if more accurate information becomes available for properties, the database will be updated. For example, if an elevation certificate is provided for a property, the surveyed elevations from the elevation certificate will be used instead of estimated first floor elevations. Flood mapping updates that impact base flood elevations will also be incorporated as necessary.

Due to the sensitive nature of this information, the current SDE database is not included in this report, but is accessible to MSD floodplain department staff. The community's SDE database will be updated by floodplain department staff annually and after major floods.

PRE-EVENT ACTIONS FOR SUBSTANTIAL DAMAGE

Substantial Damage Education

Floodplain Information Kiosk at MSD's Main Office Lobby

Residents and property owners in substantial damage areas will receive information about substantial damage, mitigation options and funding by various methods including:

Letters and newsletters - All residents located in the Special Flood Hazard Area and Local Regulatory Floodplain, as well as repetitive loss property owners in Louisville Metro, are sent an annual informational letter about floodplain topics each Fall/Winter. All properties that have been identified as potentially substantially damaged are included in this mailing. MSD's Floodplain Department will continue to send this floodplain information annually and will include information about substantial damage.

Information Kiosk – A flood information kiosk located in MSD's lobby contains brochures including substantial damage information. Brochures include: Homeowner's Guide to Retrofitting, FEMA Building Back Better Fact Sheet, Knowing Flood Risk When Buying a Home, Increased Cost of Compliance Coverage, Flood Cleanup Safety, Requirements for Floodplain Permit for Repairs/Improvements, and Tips for Selecting a Contractor.

Floodplain website – MSD provides substantial damage information on MSD's website at https://louisvillemsd.org/programs/floodplain-management/flood-permitting and includes general floodplain information at https://louisvillemsd.org/floodplain.

MSD floodplain program staff will provide an annual update or annual evaluation report to the Louisville Metro Council on MSD's management of substantial damage, its regulations, and the procedures in place to administer and enforce the regulations. These updates will occur in the spring of each year and will be distributed along with updates for the Program for Public Information, Coverage Improvement and Flood Response Preparations. Notification will occur by email with floodplain engineering staff available to answer any questions on these documents.

Substantial Damage Mitigation Options

The best options for properties with a high risk of flooding are mitigation actions taken before the next flood. In order to determine the best ways to reduce flood risk for the community,

mitigation options for each potential substantially damaged structure were considered. The mitigation options considered are listed below:

Relocation – Considered a feasible option for structures constructed on a crawl space or with a basement. This option was not considered for structures made of brick, stone or CMU based on experience with past projects.

Acquisition – Acquisition, demolition and deed restricted open space were considered for areas subjected to flash flooding with inadequate warning time for evacuation and those in the floodway/conveyance zone. This is less likely to be an option for commercial or industrial properties due to associated costs.

Acquisition/Demolition Grant Property

Elevation – Considered for properties not subject to flash flooding and not located in the floodway/conveyance zone. Only a feasible option for structures constructed on a crawl space or with a basement. This option was not considered for structures made of brick, stone or CMU based on experience with past projects.

Retrofitting – Retrofitting was considered to include: floodproofing, installation of flood vents, filling in basement or subgrade crawlspace, and first floor conversion to garage with addition of flood vents. This is a better option for commercial/industrial properties and residential properties not subject to flash flooding.

Flood Project – This option was recommended for areas of flooding that may be remedied with a future flood project such as the replacement and upsizing of a nearby culvert or the installation of a flood mitigation basin.

Restudy – Properties in areas recommended for restudy are shown to be susceptible to substantial damage based on flood mapping; however, it is suspected that mapping in this area may be in error. Further mapping analysis is required to determine if these properties can be removed from the substantial damage list.

Properties determined to be at risk for substantial damage were divided into separate geographic areas based on characteristics such as location, flood source and use type. Mitigation options were then evaluated for each area considering the structure type and depth of flooding. A general overview for each area is given below. Appendix E incudes the list of properties and the recommended mitigation.

Broadmoor Park

This area is made up of single-family homes impacted by flash flooding of South Fork Beargrass Creek. Because these homes are constructed on slab foundation, acquisition is recommended.

Bashford Manor
This area is made up of single-family homes impacted by flash flooding of South Fork Beargrass Creek. Because these homes are constructed on slab foundation and are brick, acquisition is recommended.

Broadway
This area is made up of commercial structures impacted by flash flooding of South Fork Beargrass Creek. Because these structures are constructed on slab foundation and are CMU, acquisition would be an option but due to cost, retrofitting is recommended first.

Delaware
Single-family homes in this area are subject to flash flooding from Buechel Branch. Homes are in or very near the floodway. Acquisition is recommended due to the floodway and the home construction being slab foundation.

Douglas Hills
Single-family homes along the creek in this area are subject to flash flooding due to walk out basements facing a tributary of Pope Lick. After review, this area warrants additional review for a flood project to determine if culvert upsizing or construction of a flood basin would correct flooding issues. The majority of the homes are slab foundation and have a brick exterior. Acquisition is also an option.

Fern Creek
This area is made up of single-family homes impacted by flash flooding of Hawkins Rill Creek, a tributary of Cedar Creek. Because these homes are constructed on slab foundation and are brick, acquisition is recommended.

High Gate Springs Subdivision
This area is made up of single-family homes impacted by flash flooding of South Fork Beargrass Creek. Based on GIS analysis, homes here were identified as potentially substantially damaged; however, there is no history of service requests regarding flooding for the identified structures. Restudy of this area of the floodplain was recommended to determine if these structures can be removed from the substantial damage list. Because these homes are constructed on slab foundation, acquisition would be recommended.

Hollyvilla
This area is made up of single-family homes impacted by flash flooding of Bee Lick Creek. Acquisition is recommended due to construction being on slab foundation and stone or brick construction.

Jeffersontown
This area is a mix of uses impacted by flash flooding from Chenoweth Run. Residential homes with walkout basements backing along the creek are be recommended to retrofit lower-level areas for use only as storage or garage and to install flood vents. Buildings entirely in the floodway are recommended for acquisition and demolition. Commercial buildings only partially in the floodway were recommended to remove

those portions of the building in the floodway and to retrofit the remaining building areas.

Lake Dreamland
These properties are single-family residential structures located in West Louisville directly abutting the Ohio River. Sixty percent of homes in this area are located in the floodway/conveyance zone of the Ohio River and experience regular flood events as a result. Acquisition is the only recommendation for structures in the floodway/conveyance zone. For those structures outside of the floodway, acquisition or elevation is an option for those not on a slab foundation.

Mellwood Avenue
This area contains single-family homes constructed on crawlspaces with siding. They are subject to Ohio River flooding and flash flooding from Muddy Fork Beargrass Creek. Acquisition or elevation is recommended for all structures here except for the structures immediately abutting the creek due to the depth of flooding. The structures immediately abutting the creek are recommended for acquisition.

Northeast Ohio River Beach
These properties are single-family residential structures located in Northeast Louisville directly abutting the Ohio River. This area includes Beachland Beach Rd, Rose Island Rd, Beachland Beach Rd, Transylvania Beach Rd, Juniper Beach Rd, Waldoah Beach Rd and several residential properties near River Rd. Homes in this area were constructed at various times from the early 1900's until recently, resulting in a mix of various housing styles. Overtime, some homes in this area have been demolished through the floodplain grant buyout process or removed and rebuilt to comply with floodplain ordinance requirements. Ninety percent of homes in this area are located in the floodway/conveyance zone of the Ohio River and experience regular flood events as a result. Because of their location in the floodway or just outside of it, acquisition was recommended for all structures in this area. For those structures outside of the floodway, elevation was an option for those not on a slab foundation.

Northwest Ohio River
This area is made up of industrial uses impacted by flooding from the Ohio River. Properties here are primarily smaller outbuilding and storage type structures. For this reason, acquisition or retrofitting is recommended.

Old Taylorsville
Single-family homes in this area are subject to flash flooding from Floyds Fork. Homes are in or very near the floodway. Acquisition is recommended due to the floodway and home construction being slab foundation.

Paristown
Properties in this area are commercial uses and are impacted by South Fork Beargrass Creek flooding. Retrofitting is recommended.

River Rd Commercial/Industrial
Properties in this area are all commercial or government uses near the Ohio River. Those located in the floodway/conveyance zone of the Ohio River are recommended

for acquisition, with elevation and retrofitting being recommended for the remaining structures outside the floodway/conveyance zone.

Riviera Subdivision
Riviera Subdivision is a single-family residential subdivision near the Ohio River and originally developed in the 1930s and 1940s. Overtime, some homes in the subdivision have been demolished through the floodplain grant buyout process or removed and rebuilt to comply with floodplain ordinance requirements. This process has resulted in a mix of various housing styles in the subdivision. Acquisition was the mitigation option preferred for all homes. Elevation and retrofitting were an option for properties with a crawlspace or first floor garage with siding.

St Gabriel
This area consists of single-family homes affected by flash flooding of Walnut Hill Branch. After review, this area warrants additional review for a flood project to determine if culvert upsizing would relieve some flooding issues. Acquisition and retrofitting were also options for these homes.

Shively
Single-family homes in this area are subject to flooding due to walk out basements facing Upper Mill Creek. Retrofitting the lower level of structures in this area is recommended.

Southwest Ohio River Beach Area
These properties are single-family residential structures located in Southwest Louisville directly abutting the Ohio River. This area includes Abbotts Beach Rd, Dixie Beach Rd and Dixie Highway. All homes in this area are located in the floodway/conveyance zone of the Ohio River and experience regular flood events as a result. Because of their location in the floodway, acquisition was recommended for all structures in this area.

Funding options for each mitigation alternative type are outlined below:

Acquisitions – MSD has purchased over 300 floodprone homes using FEMA's Hazard Mitigation Programs and local funding. In order to continue to reduce flood risk for the community, MSD will continue to apply for grants for acquisition of floodprone properties as funds become available. Properties with the potential for substantial damage will be given priority when determining areas to be included in grant applications. FEMA's Flood Mitigation Assistance grants are typically funded by FEMA and MSD. FEMA's Hazard Mitigation Grant Program grants are typically funded by FEMA, the Commonwealth of Kentucky, and MSD. MSD may also chose to complete acquisitions projects using only local funds, if available.

Retrofitting and Elevation – These options will be funded through ICC and owner funds. MSD will also review grant opportunities for retrofitting and elevation as funding is available.

Flood Projects – Where a flood mitigation project is determined to be of benefit to an impacted area, flood projects will be funded by MSD and/or grants as funding is available.

Restudy – The restudy of mapped floodplain areas suspected to be incorrect will be funded by MSD or grants as available.

EVALUATION OF THE PLAN

Annual Evaluation Procedure

The CRS Annual Evaluation Report template will be used to complete the annual update. Annual updates will be performed by MSD Floodplain staff. The GIS database will be updated for property ownership information and to remove demolished or otherwise mitigated structures. The SDE will also be updated. Flood mapping updates that impact the base flood elevation will also be updated. Each of the six planning steps required by CRS will be reviewed.

CRS Substantial Damage Management Plan Planning Steps
1. Asses the community's vulnerability to substantial damage. 2. Identify the community's team for the management of substantial damage to properties. 3. Identify the post-event efforts related to substantial damage. 4. Build a property database for substantial damage estimates. 5. Identify actions the community can take to address potential substantial damage. 6. Determine implementation steps and procedures for updating the plan.

The annual evaluation report will be submitted with the annual recertification to CRS. MSD floodplain department staff will share substantial damage requirements by email, along with the annual PPI report, with Louisville Metro Council in the spring of each year.

Flood insurance, repetitive loss and severe repetitive loss data has not been included in this report. The data used to determine potential substantial damage, such as the estimated first floor and base flood elevations, are publicly available; however, due to the sensitive nature of the data, specific addresses have not been included in this report.

Post-event Evaluation Procedure

The substantial damage management plan will be updated after each major flood or other damaging event to re-evaluate Louisville-Jefferson County's substantial damage management strategy and to update the substantial damage inventory and map. That update will occur within 6 months of the event.

Appendices

USACE Structure Depth-Damage Relationship Tables

Without Basement[4]

Table 1 One Story, No Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-2	0%	0.0%
-1	2.5%	2.7%
0	13.4%	2.0%
1	23.3%	1.6%
2	32.1%	1.6%
3	40.1%	1.8%
4	47.1%	1.9%
5	53.2%	2.0%
6	58.6%	2.1%
7	63.2%	2.2%
8	67.2%	2.3%
9	70.5%	2.4%
10	73.2%	2.7%
11	75.4%	3.0%
12	77.2%	3.3%
13	78.5%	3.7%
14	79.5%	4.1%
15	80.2%	4.5%
16	80.7%	4.9%

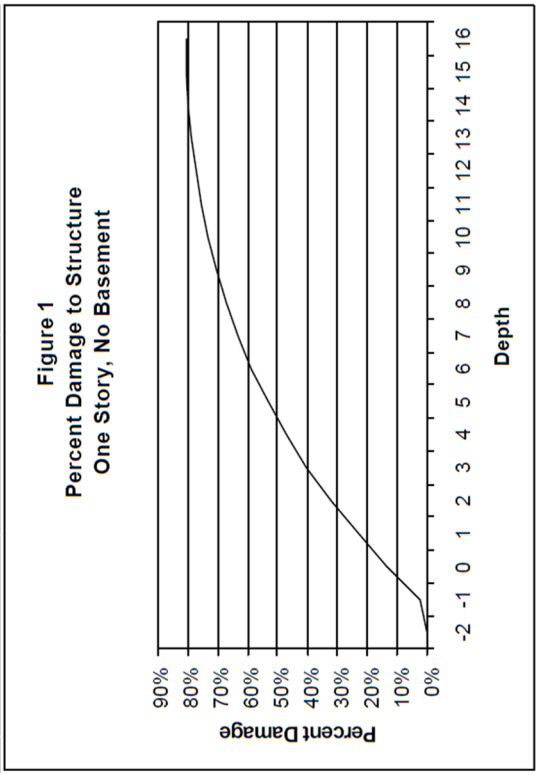
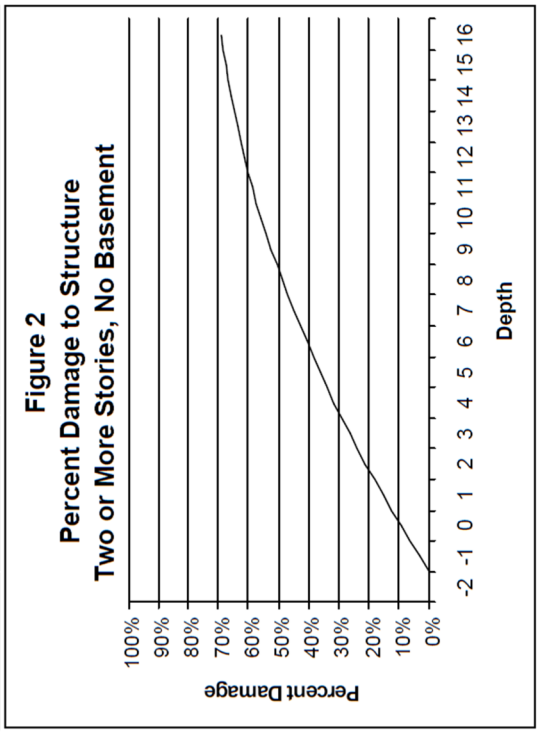


Table 2 Two or More Stories-No Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-2	0%	0.0%
-1	3.0%	4.1%
0	9.3%	3.4%
1	15.2%	3.0%
2	20.9%	2.8%
3	26.3%	2.9%
4	31.4%	3.2%
5	36.2%	3.4%
6	40.7%	3.7%
7	44.9%	3.9%
8	48.8%	4.0%
9	52.4%	4.1%
10	55.7%	4.2%
11	58.7%	4.2%
12	61.4%	4.2%
13	63.8%	4.2%
14	65.9%	4.3%
15	67.7%	4.6%
16	69.2%	5.0%



[4] United States Army Corps of Engineers. (2000) *Economic Guidance Memorandum 01-03 Generic Depth-Damage Relationships for Residential Structures without Basements.*

USACE Structure Depth-Damage Relationship Tables

With Basement[5]

Table 1 Structure One Story, With Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-8	0%	0
-7	0.7%	1.34
-6	0.8%	1.06
-5	2.4%	0.94
-4	5.2%	0.91
-3	9.0%	0.88
-2	13.8%	0.85
-1	19.4%	0.83
0	25.5%	0.85
1	32.0%	0.96
2	38.7%	1.14
3	45.5%	1.37
4	52.2%	1.63
5	58.6%	1.89
6	64.5%	2.14
7	69.8%	2.35
8	74.2%	2.52
9	77.7%	2.66
10	80.1%	2.77
11	81.1%	2.88
12	81.1%	2.88
13	81.1%	2.88
14	81.1%	2.88
15	81.1%	2.88
16	81.1%	2.88

Table 2 Structure Two or More Stories, With Basement		
Depth	Mean of Damage	Standard Deviation of Damage
-8	1.7%	2.70
-7	1.7%	2.70
-6	1.9%	2.11
-5	2.9%	1.80
-4	4.7%	1.66
-3	7.2%	1.56
-2	10.2%	1.47
-1	13.9%	1.37
0	17.9%	1.32
1	22.3%	1.35
2	27.0%	1.50
3	31.9%	1.75
4	36.9%	2.04
5	41.9%	2.34
6	46.9%	2.63
7	51.8%	2.89
8	56.4%	3.13
9	60.8%	3.38
10	64.8%	3.71
11	68.4%	4.22
12	71.4%	5.02
13	73.7%	6.19
14	75.4%	7.79
15	76.4%	9.84
16	76.4%	12.36

[5] United States Army Corps of Engineers. (2003) *Economic Guidance Memorandum 04-01 Generic Depth-Damage Relationships for Residential Structures with Basements.*

Example Annual Mailing Newsletter

Are you in or are you out?

Know Your Home's Flood Risk

To check your property's floodplain status, please visit: **apps.lojic.org/msdflooddetermination/**. If you would like to view flood mapping, visit **www.lojic.org/lojic-online**, enter your address in the search box, select Layers on the right side and check the Floodplain tab to turn on Floodplain layers.

Most homeowner and renter insurance policies do not cover flood damage. Anywhere it rains, it can flood. MSD recommends homeowners consider buying flood insurance. Check with your insurance agent to determine the right amount of flood coverage for your property. Note that your lender still retains the right to require flood insurance.

Anyone in Louisville Metro can purchase flood insurance. Without flood insurance, owners must pay to repair flood damages using loans and minimal federal assistance. Don't delay. NFIP flood insurance policies can take up to 30 days to go into effect. Just a few inches of water can cause thousands of dollars in damage.

The Louisville Metro Floodplain Ordinance states that homes in the floodplain that experience substantial damage (damages costing more than 50% of the structure's market value to repair in a one year rolling period) will be required to come into compliance with the Louisville Metro floodplain ordinance when repairing damage (i.e. the first floor and mechanicals are elevated to the freeboard requirements defined by the current floodplain ordinance). Substantially damaged homes covered by flood insurance may be eligible for Increased Cost of Compliance coverage, which is up to $30,000, to help with measures to reduce flood risk.

You can protect yourself and your home by contacting your insurance agent, visiting **www.floodsmart.gov** or calling **877.336.2627** to learn more about flood insurance. MSD Floodplain staff can answer your questions about floodplain mapping. You may contact them at **502.540.6000** or **floodpermits@louisvillemsd.org**.

FLOODPLAIN NEWS

November 2022

msd Safe, clean waterways

OUR VISION

The innovative regional utility for safe, clean waterways

An elevation certificate may save you money on flood insurance.

(See back page)

Basement flooding

If you have experienced a rain-related sewer backup through a basement-plumbing fixture—floor drain, shower, toilet or sink—or live in an area of documented wet-weather backups, MSD's **Plumbing Modification Program** can help. To date, backflow prevention devices have helped more than 17,200 customers protect their basements from sewer backups.

If approved, MSD will pay a licensed plumbing contractor to install the backflow prevention devices to your plumbing layout. Go to **LouisvilleMSD.org** to learn more or call **502.540.6000**.

Safety tips during flooding

- Move vehicles, furniture, and valuables to higher ground if possible.
- Do not drive through flooded areas. **Turn around, don't drown!**
- Stay out of the floodwater, inside and outside of your home. Six inches of flowing water can knock a person down. Water can also conduct electric current, which can be fatal.

MSD FLOODPLAIN NEWS

November 2022

Drainage problems

To solve a small drainage problem, look to see if removing obstructions or grading your yard can resolve the drainage issue. Also, check to see if a clogged ditch could be the source of any flooding problems. Clogged ditches, creeks, and channels can cause water to overflow or divert into yards and onto roads.

Never dump grass clippings or yard waste into a stream or ditch. Dumping anything in our streams is illegal and can cause flooding or water quality problems. To report obstructions or illegal dumping, contact MSD 24/7 at **502.540.6000**.

Floodplain regulations

Properties in a flood hazard area have special requirements regarding land use and construction. Regulations require a floodplain permit before you start any repair, renovation, development, improvement, or construction. MSD staff will explain the floodplain requirements to you or you can visit MSD's website for more information. If you see illegal construction in the floodplain, contact MSD immediately.

For more information about floodplain permitting, visit **LouisvilleMSD.org/floodplain**.

If you see a leaking sewer pipe or a clogged storm drain/catch basin, please report it by calling 502.540.6000.

Help keep our streams clean

- **Decrease your use of fertilizer and pesticides**. Stormwater runoff containing these chemicals can enter our waterways and cause increased algae, which depletes oxygen in the water.
- **Put pet waste in the trash**. When left on the ground, it too can cause depleted oxygen in streams.
- **Plant a tree or rain garden**—they are great filters for stormwater runoff.
- **Dechlorinate your swimming pool water before draining it.**

Elevation certificates

Having an elevation certificate for your home can save you money on flood insurance if your property is in the Special Flood Hazard Area. MSD has elevation certificates available for some properties in Louisville Metro. To check and see if an elevation certificate is on file, go to our Floodplain Website: **LouisvilleMSD.org/floodplain**. Under the Insurance tab is a list of all the elevation certificates on file.
If the property is on the list, we can send you a copy.
If a property is not on the list, a licensed surveyor must be hired to complete the elevation certificate. If you have an elevation certificate completed for your home, please send us a copy at **floodplainpermits@LouisvilleMSD.org** so that we can add it to the database.

Know when to evacuate

The Ohio River rises relatively gradually, giving several days warning before reaching flood stage. However, as we know, heavy rainstorms can cause local flooding in less than an hour. Flood watches and warnings are broadcast on NOAA weather radios, and television and local radio stations. When warning sirens are heard, tune a battery-operated radio to a local radio station and listen for weather reports and possible evacuation orders. In order to receive emergency warnings on your phone, sign up for LensALERT, Louisville's local emergency notification system. For this free service, visit **smart911.com**.

About MSD

Learn more about our Floodplain Program and other ways MSD is helping protect our community and its waterways.
LouisvilleMSD.org/floodplain.

msd
Safe, clean waterways

OUR VISION

The innovative regional utility for safe, clean waterways

24/7/365

502.587.0603 · CustomerRelations@LouisvilleMSD.org

LouisvilleMSD

Example Handout: Floodplain Permit for Repairs/Improvements

Floodplain Permit for Repairs/Improvements

MSD is required by the Louisville Metro Floodplain Ordinance to permit any development, which includes repairs, improvements, and additions, in the floodplain. If your building is in the floodplain, you must obtain a floodplain permit for any repairs or improvements prior to starting construction.

The following information is needed to obtain a floodplain permit for interior repairs or improvements:

- Application for Permit to Develop/Repair in a Floodplain, application can be found on MSD's website: https://louisvillemsd.org/sites/default/files/inline-files/apppermit_4.pdf
- Itemized cost estimate of repairs/improvements, cost estimate must include labor and itemized materials listed separately
- Building value (MSD can obtain PVA data if available) OR building appraisal

In order to obtain the permit, bring the items listed above to MSD at 700 W. Liberty Street. Our office is open from 9:00-4:00 Monday through Friday. If you cannot obtain the permit in person, you can also email the items to floodpermits@lousivillemsd.org. If you have any questions about floodplain permitting, email floodpermits@lousivillemsd.org or call MSD at 540-6000.

NOTE: MSD can permit repairs or improvements up to 50% of the value of the building in a 1 year rolling period. If the repairs or improvements are higher than 50% of the building value in 1 year, the building is required to meet the current floodplain ordinance, which means the first floor would have to be elevated at least 2' above the floodplain elevation for residential structures and 1' above the floodplain elevation for non-residential structures. Electrical and mechanical equipment must be 2' above the floodplain elevation for both residential and non-residential structures.

Example Handout: ICC Brochure

Mitigation Reduces Future Flood Damage

Is your building insured through the National Flood Insurance Program (NFIP) with a Standard Flood Insurance Policy (SFIP)? If so, you may be eligible for up to $30,000 in Increased Cost of Compliance (ICC) coverage. ICC will help cover the costs of meeting the community's rebuilding requirements that will protect your home from future flood damages.

ICC coverage can help to pay the cost of one or any combination of these four mitigation activities.

Elevate above the flood level required by your community

Relocate to a new site, preferably out of the floodplain

Demolish the building

Dry floodproof the building (primarily non-residential)

Your insurance carrier and community building department can help you to determine your ICC eligibility and the documentation you will need.

ICC Helps Reduce Future Flood Damage

Flooding badly damaged John Smith's $200,000 home. After John **reported his flood loss to his insurance carrier**, an assigned adjuster inspected the property and said he may be eligible to receive ICC and should talk to his community building department.

John contacted the **community building department** and **after an inspection of the home, it was declared substantially damaged**. John and the building department jointly decided elevating his home was the best way to meet the local floodplain rebuilding requirements and reduce future flood damage.

John provided the substantial damage letter he received from his community building department to the insurance carrier. After **the insurance carrier verified that the flood damages equaled at least 50 percent of the pre-flood market value, John qualified to receive ICC**. After submitting a signed contract for the work, a building permit from the building department, and a signed ICC Proof of Loss form, **John was ready to elevate his home***.

*Check with your insurance carrier to determine if you are able to receive a partial payment to help with the initial mitigation activity costs.

For more information about the NFIP, flood insurance, and ICC, contact your insurance carrier or visit www.FloodSmart.gov.

National Flood Insurance Program

Increased Cost of Compliance Coverage

Reduces Future Flood Damages

FEMA

F-663

What is Increased Cost of Compliance (ICC)?

ICC coverage is included under the National Flood Insurance Program (NFIP) Standard Flood Insurance Policy (SFIP). ICC helps policyholders with the costs incurred if they are required by the community building department to meet rebuilding standards after a flood.

ICC coverage provides up to $30,000 to help pay for relocating, elevating, demolishing, and floodproofing (non-residential buildings), or any combination of these mitigation activities.

The ICC portion of the claim is handled separately from the building and/or contents portion of the claim. However, the combination of payments cannot exceed the maximum coverage limits available through the NFIP. For example, a policyholder cannot receive more than $250,000 in claim payments for a residential building.

Are You Eligible to File a Claim for ICC?

Yes, if:

1) You have an NFIP flood insurance policy; and
2) Your community building department determines your home is substantially or repetitively damaged by flooding; and
3) The flood damage to your home is equal to 50 percent of the pre-flood market value.

"Substantially damaged" means damages of **any** origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damages occurred.

"Repetitively damaged" means the building must have flood damage on at least two occasions during a 10-year period; the cost of which to repair the flood damage, on average, equaled or exceeded 25 percent of the market value of the building on each occasion.

Starting the ICC Claims Process after a Flood

1. If your community building department determines your structure is substantially or repetitively damaged, discuss what mitigation activities will be required to rebuild in the floodplain and if any grants may be available.
2. Promptly contact your insurance carrier to file a claim for ICC and document the loss (photographs, etc.) Do not begin minor repair work before filing an ICC claim.
3. Submit to your insurance carrier the letter from your community building department declaring the building substantially or repetitively damaged, a signed contract for the mitigation activity, and the building permit that documents rebuilding requirements in the floodplain.
4. The insurance carrier will verify that the flood damage to your building equals at least 50 percent of the pre-flood market value, which is required to start the ICC claim.

Where to Get More Information

For more information about the ICC claim process, visit www.FEMA.gov/Increased-Cost-Compliance-Coverage, contact your insurance carrier, or your State NFIP Coordinator (http://www.floods.org/).

Things to Remember about ICC

- After it has been determined which mitigation activity you will be taking, contact your insurance carrier to file a claim for ICC. An adjuster will be assigned to you.
- Your adjuster will ask you to submit your substantial damage letter and building permit from the community building department, a copy of a signed contractor bid for the work, and a signed ICC Proof of Loss form, which the adjuster may provide to you as a courtesy.
- Before you begin the work, check with your insurance carrier to see if you are able to receive a partial payment to help cover some of the initial construction costs.
- After the work is completed, your community building department will provide written evidence the work meets the floodplain management regulations. Submit this to your insurance carrier to receive a full or remaining partial ICC payment.
- If necessary, your community building department may also be able to use ICC to supplement Federal or state grant funding for your elevation, demolition, relocation, or floodproofing (non-residential buildings).

Example Handout: Know Your Flood Risk When Buying a Home

Are you buying a home?

You should check and see if it has flooded or had drainage problems. Even a shallow flood can cause costly damage.

If a home is located in a Federal Emergency Management Agency (FEMA) Special Flood Hazard Area, it is five times more likely to experience a flood than a fire, so you should consider purchasing flood insurance.

Simply enter your address to determine if your property is in a FEMA floodplain area.
https://apps.lojic.org/msdflooddetermination/

msd
Safe, clean waterways

700 West Liberty Street
Louisville, KY 40203-1911

502.587.0603
CustomerRelations@LouisvilleMSD.org

Learn more about MSD and ways we are helping protect our community and its waterways.

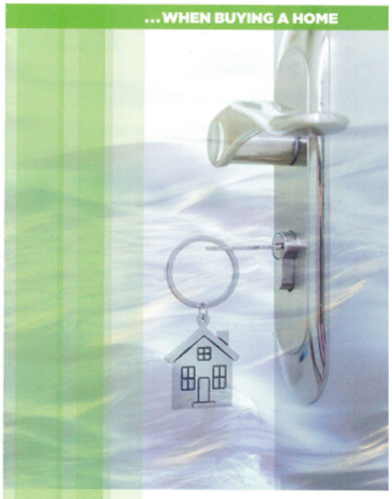
LouisvilleMSD.org

LouisvilleMSD

msd
Safe, clean waterways

KNOW YOUR FLOOD RISK...

...WHEN BUYING A HOME



Buying a home in a Special Flood Hazard Area

If you buy a home in a Special Flood Hazard Area and get a mortgage that is regulated or insured by the Federal Government, you will be required to buy a flood insurance policy. Ask the seller and the agent if they know of any flooding or drainage problems at the property.

Check to see if the property is located in a Special Flood Hazard Area. For properties in Jefferson County, Kentucky visit:
https://apps.lojic.org/msdflooddetermination/

Flood Insurance Rate Maps

FEMA has Flood Insurance Rate Maps that show Special Flood Hazard Areas and flood zones.

- **A Zones** (A and AE) are high-risk areas. There is at least a 1 in 4 chance of flooding during a 30-year mortgage. All home and business owners in these areas with mortgages from federally regulated or insured lenders are required to buy flood insurance.
- **X Zones** are moderate-to-low risk areas according to FEMA maps. The risk of flooding is reduced but not removed. Flood insurance is not required but may be advised, especially if you are in the Local Regulatory Floodplain.

The **Local Regulatory Floodplain** includes homes that are beyond the edges of the FEMA A Zones. These properties have been identified as has having a higher risk of flooding than areas outside the Local Regulatory Floodplain. Owners of these properties are required to follow the regulations in the Louisville Metro Floodplain Ordinance.

Flood insurance is not federally required in

What Prospective Property Owners Should Know

Local Floodplain Management Regulations
MSD and the Kentucky Division of Water regulate construction and development in identified floodplains to ensure buildings are protected from flood damage.

- Any development (including renovations and additions) in the floodplain requires a permit from MSD and the Kentucky Division of Water.
- Filling in areas with extra soil and similar projects are prohibited in certain areas.
- Houses that are considered substantially damaged (i.e., more than 50 percent of its market value) by fire, flood or other causes must be elevated to at least one foot above the flood level when they are repaired.
- Houses cannot be substantially improved (i.e. more than 50 percent of its market value) in a 1-year rolling period unless they are elevated to at least one foot above the flood level.
- New construction in the Floodplain, including additions, must be elevated at least two feet above the flood level.

Questions?

If you have questions about special land use, building, or floodplain management regulations that apply to a property, contact MSD at **502.540.6439.**

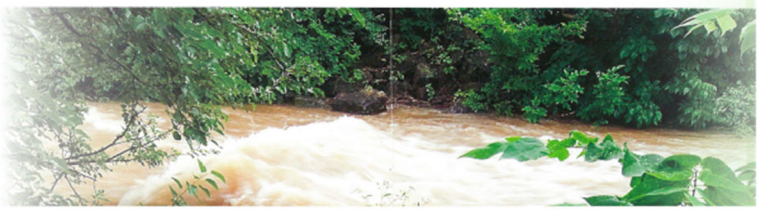
For more information about flooding, visit MSD's Floodplain Management website at: **http://www.msdlouky.org/programs/crssite/fpindex.html**

For flood insurance information, visit **www.floodsmart.gov.**

Other Resources

You can check on Special Flood Hazard Areas in Jefferson County three ways:

- MSD's Flood Determination website: **https://apps.lojic.org/msdflooddetermination/**
- The online LOJIC Map: **www.lojic.org**
- FEMA's Map Service Center: **http://msc.fema.gov**



Example Handout: Homeowner's Guide to Retrofitting

Who the Guide is For

As a homeowner, you need clear information about the retrofitting options that are available to help reduce flood damage to your home, as well as guidance on selecting the option that is best for you. FEMA P-312 is intended for homeowners who have little or no knowledge of flood protection methods or building construction techniques.

In order to avoid repetitive flood damage to your home, you need to know what damage-reduction methods are available, the degree to which they are successful, how much they cost, and whether they are likely to meet your needs. These issues are addressed by the guide. In addition, the guide explains how the degree of flood risk can vary from one location to another. By knowing the basic questions to ask your local officials, you are guided toward the retrofitting technique that is appropriate for you.

Under State or local laws, ordinances, or regulations, some retrofitting techniques may not be used in certain circumstances. This is another important reason to consult your local officials.

Want to Learn More?

Homeowner's Guide to Retrofitting: Six Ways to Protect Your Home From Flooding, FEMA P-312, Second Edition

FEMA P-312 can be downloaded from FEMA's web site: http://www.fema.gov/library/viewRecord.do?id=1420.

You can also call 1-800-480-2520 to order a copy of FEMA P-312 or other FEMA publications, including those listed below.

Related Publications

- **FEMA 259**, *Engineering Principles and Practices for Retrofitting Flood-Prone Residential Buildings* (recommended for architects and engineers)
- **FEMA 348**, *Protecting Building Utilities from Flood Damage*
- **FEMA 499**, *Home Builder's Guide to Coastal Construction Technical Fact Sheets*
- **FEMA P-85**, *Protecting Manufactured Homes from Floods and Other Hazards: A Multi-Hazard Foundation and Installation Guide*, Second Edition
- **FEMA P-550**, *Recommended Residential Construction for Coastal Areas*, Second Edition

Homeowner's Guide to Retrofitting

Six Ways To Protect Your House From Flooding

FEMA L-235 / December 2009

FEMA

FEMA L-235
Catalog No. 10047-1

FEMA

What is "Retrofitting"?

Retrofitting means making changes to an existing building to protect it from flooding or other hazards such as high winds and earthquakes. FEMA publication P-312, Second Edition, *Homeowner's Guide to Retrofitting: Six Ways to Protect Your Home From Flooding*, provides information that will help you decide whether your home is a candidate for retrofitting.

The guide describes six retrofitting methods that can help to protect your home from flooding.

Elevation is raising your home so that the lowest floor is above the flood level. This is the most common way to avoid flood damage.

Wet floodproofing is making uninhabited parts of your home resistant to flood damage when water is allowed to enter during flooding.

Relocation is moving your home to higher ground to protect it from flooding.

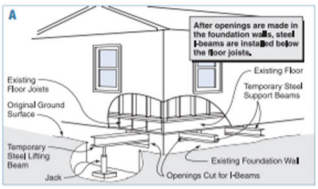
Dry floodproofing is sealing your home's exterior walls to protect your home from flooding.

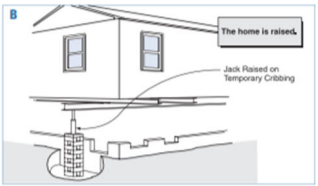
Levee and floodwall protection is constructing barriers to prevent floodwaters from entering your home.

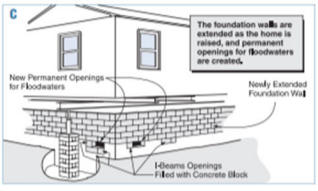
Demolition is razing your home and rebuilding properly on the same property or buying a home elsewhere.

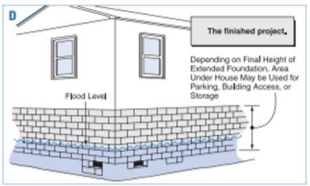
FEMA P-312 uses photographs and illustrations to help explain how each of the six retrofitting methods works.

For example, this series of illustrations from the guide shows how a home on a basement or crawlspace foundation can be elevated above the flood level on extended foundation walls.









The Next Step

Whether or not your home has been damaged by flooding, contact your local floodplain administrator or building official before retrofitting. This is a critical step to reducing potential flood losses. Local officials know the retrofitting methods that meet State and local government requirements.

Financial Assistance

FEMA P-312 provides information on government and non-government financial assistance (e.g., loans, grants, and insurance payments) that can help homeowners with retrofitting projects.

For example, under FEMA's National Flood Insurance Program (NFIP), a policy holder may qualify for Increased Cost of Compliance (ICC) coverage. If your home is substantially damaged by flooding, ICC coverage may help to pay for some types of retrofitting. The Hazard Mitigation Assistance grant programs are designed to provide financial assistance for retrofit projects. FEMA P-312 describes financial assistance and how you might qualify.

700 West Liberty Street | Louisville, KY 40203-1911
Phone: 502.540.6000 | LouisvilleMSD.org

Date

«OwnerAddressLine1»

«OwnerAddressLine2»

«OwnerAddressLine3»

Re: Property at «PropertyAddressLine1» Louisville, KY

Dear Property Owner:

Due to the recent flooding, your property may have suffered flood damage. According to Louisville's Floodplain Ordinance, MSD is required to make sure all development in the floodplain is permitted, including repairs from flood damage.

What is needed for a permit for interior repairs or improvements?

Application for Permit to Develop/Repair in a Floodplain, which can be found at MSD's Main Office or on MSD's website: http://louisvillemsd.org/sites/default/files/inline-files/apppermit_1.pdf

Cost estimate of repairs/improvements, estimate must be itemized and include an estimate for labor separately (even when work is being done by homeowner or volunteers)

Building value - MSD can use PVA data, if available, OR owner can provide appraisal

Permit applications and required supporting documents may be submitted via email to floodpermits@lousivillemsd.org or submitted in-person at MSD, 700 W Liberty St, Monday-Friday 9:00-4:00.

Floodplain permits are not required before cleaning up and residents are encouraged to begin cleaning up as soon as possible. If possible, take photographs of any damage before cleaning up. Below are flood safety tips from FEMA:

> Confirm the water supply is safe to drink. Listen for news reports to learn whether the community's water supply has been contaminated by the floodwaters. Remember to carry bottled drinking water and discard any food products that may have come in contact with floodwater.

Wear protective clothing. Protect yourself during cleanup by wearing boots, gloves and masks. Clean and disinfect everything floodwater contacted.

Ventilate your home. Open all doors and windows to allow air to circulate and dry out your home. Dehumidify as soon as possible after a flood.

Service damaged septic tanks, cesspools, pit and leaching systems as soon as possible. Damaged sewage systems are serious health hazards.

Make a list of lost or damaged items. Be sure to include their age and value, and if possible, have receipts for those items available for insurance.

Prevent mold growth. Wash all surface areas in the house that came in contact with floodwater. Disinfect and wipe surfaces dry with paper towels to minimize bacterial contamination.

Isolate any moldy objects. Seal moldy trash in plastic bags and remove them immediately. Objects you can save should be dried as soon as possible.

Did you know you may be eligible for up to $30,000 to elevate, relocate, or demolish a flood damaged building? If your structure is substantially damaged, which is defined as the building having damages or improvements that are more than 50% of the value of the building in the last year, and you carry flood insurance, you may be eligible for up to $30,000 to elevate, relocate, or demolish your structure using Increased Cost of Compliance (ICC) funds from FEMA. Information about ICC funds can be found at this website: https://www.fema.gov/floodplain-management/financial-help/increased-cost-compliance.

If you have any questions, please contact the floodplain hotline at (502)540-6126 or email at floodpermits@lousivillemsd.org.

Sincerely,

Lori Rafferty, PE, CFM
MS4/Floodplain Program Manager

700 West Liberty Street | Louisville, KY 40203-1911
Phone: 502.540.6000 | LouisvilleMSD.org

Date

Owner Name

Owner Mailing Address 1

Owner Mailing Address 2

RE: Subject Property Address, NOTICE OF SUBSTANTIAL DAMAGE

Dear Owner Name:

As Metro Government's Floodplain Manager, it is MSD's responsibility to enforce floodplain regulations in Jefferson County. Per the Louisville Metro Floodplain Ordinance, the substantial damage definition includes all damages or improvements made to the structure within a 1-year rolling period. Based on the estimate for the recent flood damage repair due to [list flood event], we have found the structure located at [Subject Property Address] in Louisville, KY to be substantially damaged. The cost to repair the building to its pre-damage condition exceeds 50 percent of the market value of the building, excluding the land.

As a result of this determination, you are required to bring the building into compliance with the Louisville Metro Floodplain Ordinance or remove the building from the floodplain. In order to comply with the Floodplain Ordinance, the first floor of the building, along with the mechanical and electrical equipment, must be elevated at least XXX feet above the base flood elevation of [XXX.X].

A copy of the Floodplain Ordinance can be found at the following website: http://louisvillemsd.org/programs/programs-and-projects/floodplain-management/flood-related-documents.

If you have any questions, please contact me at (502) 540-6344.

Sincerely,

Lori Rafferty, PE, CFM

Floodplain Manager

Recommendation Mitigation for Potential Substantial Damage Structures

Area	Property Identifier	Relocation	Acquisition	Elevation	Retrofitting	Flood Project	Restudy	Justification
Bashford Manor	Bashford Manor 1		X					Brick, slab
Broadmoor Park	Broadmoor Park 1		X					Slab foundation
Broadmoor Park	Broadmoor Park 2		X					Floodway, slab foundation
Broadway	Broadway 1		X		X			Commercial, slab foundation
Broadway	Broadway 2		X		X			Commercial, slab foundation
Douglas Hills	Douglass Hills 1		X			X		Brick, walkout basement garage, potential culvert replacement or flood basin project
Fern Creek	Fern Creek 1		X					Slab foundation, brick
High Gate Springs Subdivision	High Gate Springs 1		X				X	Slab foundation
High Gate Springs Subdivision	High Gate Springs 2		X				X	Slab foundation
High Gate Springs Subdivision	High Gate Springs 3		X				X	Slab foundation
High Gate Springs Subdivision	High Gate Springs 4		X				X	Slab foundation
Hollyvilla	Hollyvilla 1		X					Slab foundation, stone construction
Jeffersontown	Jeffersontown 1				X			Commercial, slab, floodway, remove part of structure in floodway, retrofit remaining
Jeffersontown	Jeffersontown 2				X			Brick, walkout slab basement impacted
Jeffersontown	Jeffersontown 3		X					Gov. owned metal storage bldg, floodway, slab foundation, remove structure
Lake Dreamland	Lake Dreamland 1		X					Floodway
Lake Dreamland	Lake Dreamland 2		X					Floodway
Lake Dreamland	Lake Dreamland 3		X					Floodway
Lake Dreamland	Lake Dreamland 4		X					Floodway
Lake Dreamland	Lake Dreamland 5		X					Floodway
Lake Dreamland	Lake Dreamland 6		X					Floodway
Lake Dreamland	Lake Dreamland 7		X					Floodway
Lake Dreamland	Lake Dreamland 8		X					Floodway
Lake Dreamland	Lake Dreamland 9		X					CMU, crawl
Lake Dreamland	Lake Dreamland 10		X	X				Crawlspace, vinyl
Lake Dreamland	Lake Dreamland 11		X					Slab
Lake Dreamland	Lake Dreamland 12		X	X				Crawlspace, vinyl
Lake Dreamland	Lake Dreamland 13		X	X				Crawlspace, vinyl
Lake Dreamland	Lake Dreamland 14		X	X				Crawlspace, vinyl
Mellwood Avenue	Mellwood Ave 1		X	X				Crawlspace, siding
Mellwood Avenue	Mellwood Ave 2		X	X				Crawlspace, siding
Mellwood Avenue	Mellwood Ave 3		X					Crawlspace, siding
NE Ohio River Beach Area	NE Ohio River Beach 1		X					Slab, brick
NE Ohio River Beach Area	NE Ohio River Beach 2		X	X	X			Siding, on piers, would need to elevate 15' min
NE Ohio River Beach Area	NE Ohio River Beach 3		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 4		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 5		X	X	X			Siding, on piers, would need to elevate 15' min
NE Ohio River Beach Area	NE Ohio River Beach 6		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 7		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 8		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 9		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 10		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 11		X					Floodway, slab
NE Ohio River Beach Area	NE Ohio River Beach 12		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 13		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 14		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 15		X	X	X			Floodway, already partically elevated
NE Ohio River Beach Area	NE Ohio River Beach 16		X	X				Crawlspace, siding
NE Ohio River Beach Area	NE Ohio River Beach 17		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 18		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 19		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 20		X					Floodway

Recommendation Mitigation for Potential Substantial Damage Structures

Area	Property Identifier	Relocation	Acquisition	Elevation	Retrofitting	Flood Project	Restudy	Justification
NE Ohio River Beach Area	NE Ohio River Beach 21		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 22		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 23		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 24		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 25		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 26		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 27		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 28		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 29		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 30		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 31		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 32		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 33		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 34		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 35		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 36		X					Floodway, slab
NE Ohio River Beach Area	NE Ohio River Beach 37		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 38		X	X	X			Garage first floor, primarily wood siding
NE Ohio River Beach Area	NE Ohio River Beach 39		X					Floodway, slab
NE Ohio River Beach Area	NE Ohio River Beach 40		X					Floodway, slab
NE Ohio River Beach Area	NE Ohio River Beach 41		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 42		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 43		X	X				First floor garage, masonry block
NE Ohio River Beach Area	NE Ohio River Beach 44		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 45		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 46		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 47		X	X	X			First floor garage, stucco
NE Ohio River Beach Area	NE Ohio River Beach 48		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 49		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 50		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 51		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 52		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 53		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 54		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 55		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 56		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 57		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 58		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 59		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 60		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 61		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 62		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 63		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 64		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 65		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 66		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 67		X					Floodway
NE Ohio River Beach Area	NE Ohio River Beach 68		X					Floodway
NW Ohio River Area	NW Ohio River 1		X		X			CMU, slab
Old Taylorsville	Old Taylorsville 1		X					Slab, one story
Old Taylorsville	Old Taylorsville 2		X					Floodway
Old Taylorsville	Old Taylorsville 3		X					Floodway

Recommendation Mitigation for Potential Substantial Damage Structures

Area	Property Identifier	Relocation	Acquisition	Elevation	Retrofitting	Flood Project	Restudy	Justification
Paristown	Paristown 1				X			CMU warehouse
River Rd Commercial/Industrial	River Rd Com/Ind 1			X	X			Commercial, Louisville Boat Club Pool House
River Rd Commercial/Industrial	River Rd Com/Ind 2				X			Gas Station
River Rd Commercial/Industrial	River Rd Com/Ind 3				X			Hotel
River Rd Commercial/Industrial	River Rd Com/Ind 4				X			9' in floodplain
River Rd Commercial/Industrial	River Rd Com/Ind 5				X			existing builidng to be remodeled with development plan on file
River Rd Commercial/Industrial	River Rd Com/Ind 6		X		X			Golf center
River Rd Commercial/Industrial	River Rd Com/Ind 7		X					Floodway
River Rd Commercial/Industrial	River Rd Com/Ind 8			X	X			Louisville boat club, 9' in the floodplain
River Rd Commercial/Industrial	River Rd Com/Ind 9		X					Floodway, conveyance
River Rd Commercial/Industrial	River Rd Com/Ind 10				X			Fire station
River Rd Commercial/Industrial	River Rd Com/Ind 11		X					Floodway, conveyance
River Rd Commercial/Industrial	River Rd Com/Ind 12		X					Tavern, slab, vinyl
Riviera Subdivision	Riviera Subdivision 1		X					Slab, siding
Riviera Subdivision	Riviera Subdivision 2		X		X			Slab, CMU
Riviera Subdivision	Riviera Subdivision 3		X					Slab, brick
Riviera Subdivision	Riviera Subdivision 4		X					Brick
Riviera Subdivision	Riviera Subdivision 5		X					Brick, crawl
Riviera Subdivision	Riviera Subdivision 6		X					Brick
Riviera Subdivision	Riviera Subdivision 7		X	X				Slab, siding
Riviera Subdivision	Riviera Subdivision 8		X		X			Slab, siding, two story
Riviera Subdivision	Riviera Subdivision 9		X	X				Siding, crawlsapce
Riviera Subdivision	Riviera Subdivision 10		X					Slab, concrete
Riviera Subdivision	Riviera Subdivision 11		X	X				Over garage level
Riviera Subdivision	Riviera Subdivision 12		X					Brick, slab
Riviera Subdivision	Riviera Subdivision 13		X	X				Over garage level
Riviera Subdivision	Riviera Subdivision 14		X	X				Over garage level
Riviera Subdivision	Riviera Subdivision 15		X					Slab
Riviera Subdivision	Riviera Subdivision 16		X	X				Over garage level
Riviera Subdivision	Riviera Subdivision 17		X		X			Slab, siding, two story
Riviera Subdivision	Riviera Subdivision 18		X					Stone/CMU
Riviera Subdivision	Riviera Subdivision 19		X					Slab, brick
Riviera Subdivision	Riviera Subdivision 20		X	X				Crawlspace/Basement, siding
Saint Gabriel	Saint Gabriel 1		X		X	X		Brick, slab
Saint Gabriel	Saint Gabriel 2		X		X	X		Brick, crawl
Shively	Shively 1		X		X			Brick with basement
SW Ohio River Beach Area	SW Ohio River Beach 1		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 2		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 3		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 4		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 5		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 6		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 7		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 8		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 9		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 10		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 11		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 12		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 13		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 14		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 15		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 16		X					Floodway

Recommendation Mitigation for Potential Substantial Damage Structures

Area	Property Identifier	Relocation	Acquisition	Elevation	Retrofitting	Flood Project	Restudy	Justification
SW Ohio River Beach Area	SW Ohio River Beach 17		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 18		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 19		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 20		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 21		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 22		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 23		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 24		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 25		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 26		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 27		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 28		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 29		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 30		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 31		X					Floodway
SW Ohio River Beach Area	SW Ohio River Beach 32		X					Floodway