



## KC WATER

### OFFICE OF THE DIRECTOR

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**Date:** Sept. 28, 2026  
**To:** Mayor, City Council, and City Manager  
**From:** Andy Shively, PE, Deputy Director  
**Subject:** 2025 Annual Floodplain Management Plan Progress Report

Water Services Department is pleased to submit the 2025 Annual Progress Report for the City's implementation of the flood management part in the City's 2025 Multi-Hazard Mitigation Plan, which adopts the part pertinent to KCMO's responsibilities in the Mid-America Regional Council (MARC)'s 2025 Regional Multi-Hazard Mitigation Plan. The report is prepared by Water Services Department with support and input from multiple other City departments including Office of Emergency Management, Planning & Development, Aviation, Public Works, Fire, Police, Health and Parks & Recreation. The report and its submission to elected officials are required per the Federal Emergency Management Agency's (FEMA) requirements.

The City's Multi-Hazard Mitigation Plan was adopted by Resolution No. 250514 in 2025, as part of the Mid-America Regional Council (MARC)'s 2025 Regional Multi-Hazard Plan. Filing the annual report allows the City to continue to obtain annual recertification and remain within FEMA's National Flood Insurance Program (NFIP) Community Rating System (CRS). The City participates in the CRS to earn a flood insurance premium discount for all insurable properties within the City. For credit under the CRS, the annual progress report must be distributed to the media and be made available to the public. Progress Reports are posted on the Water Services Department's website at [www.kcwater.us/crs](http://www.kcwater.us/crs)

This report officially accounts for FEMA floodplains adopted by the City on January 20, 2017 and for minor updated ones adopted on November 8, 2023, which leveraged all local, state, and federal mitigation projects for Brush Creek, Indian Creek and Blue River completed to date and approximately \$13 million in watershed modeling completed by the City's Water Services Department, Public Works department, the U.S. Army Corps of Engineers-Kansas City District (USACE), the U.S. Geological Survey (USGS), and the Federal Emergency Management Agency (FEMA) over time. Some of the mitigation efforts by the City and USACE go back to the 1970s. There are also multiple ongoing mitigation or mitigation-supporting efforts including the construction of a flyover bridge at the Swope Park Industrial area, a planning study for Little Blue River Watershed, and the City-wide Sewer Rehabilitation within Waterways.

The City made the following progress:

- Completed the Flyover Bridge at the Swope Park Industrial Area. The bridge ensures an access during flooding events.
- Completed the last phase construction for the Swope Industrial Park Levee. The newly constructed levee system provides protection to the industrial area.
- Partnering with local communities and Kansas City Metro Chapter of American Public

Works Association (APWA) to update the Regional APWA Section 5600 Storm Drainage Systems and Facilities and Best Management Practices Manual for better management of stormwater.

- Conducting an extensive public education and outreach effort to promote public awareness of flooding risks and risk prevention and management strategies.
- Continuing to partner with U.S. Army Corps of Engineers, MARC and six other local communities on Little Blue River Study to analyze flood risks and develop mitigation strategies and plans. A draft of the Technical Report with Environmental Considerations for the Little Blue River Flood Risk Management Study was generated.
- Continuing to work with U.S. Geological Survey on the project for Blue River Flood Inundation Mapping to support flood risk analysis. The final product will become an online tool accessible to the public for knowledge of the flooding risks of the Blue River.
- Continuing to work on the American-Rescue-Plan-Act (ARPA) funded Flood Warning System Expansion project to upgrade the flood alert system. The upgraded system will be robust and provide seamless communication.
- Continuing to work on the project of Updating the National Wetlands Inventory of the HUC-12 Watersheds in Kansas City, MO, funded by the U.S. Environmental Protection Agency. The updated mapping of the existing wetlands will provide a scientific base for development planning and resource preservation.
- Continue to work on the project – the City-Wide Sewer Rehabilitation within Waterways. This is a design/build project that identifies, rehabilitates and protects critical sewer infrastructure compromised by age and proximity to dynamic, eroding, migrating, or incising waterways, utilizing engineered streambank armoring and geotechnical stabilization to secure the surrounding stream banks from future erosion that could compromise sewer assets.
- Developing a digital twin and live modeling system for the stormwater network, leveraging existing stormwater sensor network (StormWatch) and the FEMA hydraulic model.
- Starting to partner with U.S. Army Corps of Engineers to work on two studies - the Dam Breach Inundation Flood Risk Management Study and Updating the Floodplain Management Plan, both funded by USACE. The result from the former will provide a guidance for emergency responses at the local level, and the product from the latter will improve the existing plan and provide a more practical plan that can help our floodplain management in an effective manner.
- Starting the project Indian Creek Flood Risk Reduction & Erosion Control Study. The result of this study will help the City to prioritize the funding to address bank erosion efficiently.

This progress report includes the following information:

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| <b>Annual Status Update on the Plan’s Action Items.....</b> | <b>5</b>  |
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## Background

Since the 2025 Multi-Hazard Mitigation Plan was adopted in July, 2025, we still follow the 2020 Multi-Hazard Mitigation Plan for the purpose of this report. The report includes 36 primary objectives for flooding. These primary objectives have 160 actions:

| Primary Objective (36)                                                                                                  | No of Actions | Primary Entity/Entities                | Secondary, Supporting Party                      |
|-------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------|--------------------------------------------------|
| Decrease the number of fatalities and injuries from flooding                                                            | 2             | Water Services                         |                                                  |
| Discourage new development in floodplain and flood prone areas                                                          | 1             | Water Services                         |                                                  |
| Enhance Health Department's ability to mitigate disease related issues caused by floods                                 | 4             | Health Dept.                           |                                                  |
| Enhance public awareness and education efforts related to flooding.                                                     | 3             | Water Services                         | Emergency Management                             |
| Enhance public awareness of the hazards associated with dam failures, as well as mitigation and preparedness activities | 3             | Water Services                         |                                                  |
| Enhance public awareness, outreach and education efforts related to flooding                                            | 7             | Emergency Management                   | Water Services                                   |
| Enhance the ability to protect the public during flooding incidents to mitigate loss of life and property               | 2             | Police                                 | Water Services                                   |
| Enhance the capabilities of city departments with flood response duties to mitigate damage from floods                  | 4             | Water Services<br>Emergency Management | Water Services,<br>Public Works,<br>Parks & Rec. |
| Enhance the EOC capability to monitor and mitigate flood conditions                                                     | 3             | Water Services                         |                                                  |
| Ensure continued operability of dam to prevent failure and resulting damage to the MCI facilities.                      | 1             | Aviation                               |                                                  |
| Ensure levee requirements and integrity are maintained to prevent damage from flooding due to levee failure             | 3             | Water Services                         |                                                  |
| Examine repetitive flood loss properties and determine feasible and practical mitigation options                        | 4             | Water Services                         | Planning Dept.,<br>floodplain manager            |
| Expand KCPD's ability to assist with life safety operations during flooding                                             | 2             | Police                                 |                                                  |
| Implement or improve flood warning systems                                                                              | 8             | Water Services                         | Emergency Management                             |

|                                                                                                                    |          |                                            |                                                            |
|--------------------------------------------------------------------------------------------------------------------|----------|--------------------------------------------|------------------------------------------------------------|
| Implement projects and procedures to enhance resiliency of KCMO infrastructure against flood damage                | 6        | Public Works or Water Services             | Water Services, Planning Dept., Emergency Management       |
| Improve and enhance the capability to respond to and mitigate damage from flooding incidents                       | 1        | Public Works, Parks & Rec., Water Services | Emergency Management                                       |
| Improve community resiliency to flooding                                                                           | 1        | Planning Dept., floodplain manager         | Water Services                                             |
| Improve flood hazard assessments and flood mapping                                                                 | 9        | Water Services                             | Planning Dept., Public Works, Parks & Rec., Water Services |
| Improve flood hazard assessments and flood mapping to assist in mitigating damage from flooding                    | 9        | Water Services                             |                                                            |
| Improve hazard assessment information for dams within Kansas City, MO                                              | 9        | Water Services                             | Emergency Management                                       |
| Improve KCMO's ability to mitigate damage from hazardous materials released due to flooding                        | 7        | Fire Dept.                                 |                                                            |
| <b>Improve reliability and capability of telecommunications network to resist the effects of flooding</b>          | <b>1</b> | <b>Police Dept.</b>                        | <b>Emergency Management</b>                                |
| <b>Improve the capabilities of water rescue teams</b>                                                              | <b>3</b> | <b>Fire Dept.</b>                          |                                                            |
| <b>Improve the capability of the Aviation Department to mitigate the damage from flooding</b>                      | <b>5</b> | <b>Aviation</b>                            |                                                            |
| <b>Improve the capability of the Aviation Department to mitigate the damage from flooding due to levee failure</b> | <b>2</b> | <b>Aviation</b>                            |                                                            |
| <b>Improve the structural integrity of dams to reduce the threat of dam failures, which cause flooding</b>         | <b>4</b> | <b>Water Services</b>                      | <b>Neighborhoods</b>                                       |
| <b>Improve warning and evacuation systems and procedures in the event of flooding due to dam failure</b>           | <b>2</b> | <b>Water Services</b>                      |                                                            |
| <b>Incorporate strategies into KCMO development plans to mitigate damage from flooding</b>                         | <b>1</b> | <b>Planning Dept.</b>                      |                                                            |
| <b>Increase public awareness of health and disease related issues associated with flood waters</b>                 | <b>3</b> | <b>Health Dept.</b>                        | <b>Emergency Management</b>                                |

|                                                                                                                                                                                                               |            |                                                      |                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------------------------------------|-----------------------------|
| <b>Integrate flood mitigation strategies with projects and activities designed to protect, restore, or enhance ecosystems and the environment and/or create recreational opportunities for the community.</b> | <b>11</b>  | <b>Water Services, Planning Dept.</b>                | <b>Emergency Management</b> |
| <b>Mitigate flooding damage to public facilities</b>                                                                                                                                                          | <b>3</b>   | <b>Water Services</b>                                |                             |
| <b>Participate in and ensure compliance with flood mitigation and floodplain management programs.</b>                                                                                                         | <b>8</b>   | <b>Planning Dept., Water Services</b>                |                             |
| <b>Reduce flood related damage to public and private property in flood prone areas through structural and nonstructural retrofits, prevention of development within, or removal of property</b>               | <b>11</b>  | <b>Water Services, floodplain management</b>         | <b>Planning Dept.</b>       |
| <b>Reduce flood-related damage to public, residential, and commercial property in flood-prone areas through structural and nonstructural retrofits or removal of property.</b>                                | <b>11</b>  | <b>Water Services, Planning Dept.</b>                |                             |
| <b>Reduce the potential for flooding due to dam failures by enhancing inspection efforts</b>                                                                                                                  | <b>4</b>   | <b>Water Services, Planning Dept., Neighborhoods</b> |                             |
| <b>To decrease the threat of flooding, reduce the potential for dam failures by adding to the number of dams regulated by the state.</b>                                                                      | <b>2</b>   | <b>City Council, Water Services</b>                  |                             |
| <b>Total Actions</b>                                                                                                                                                                                          | <b>160</b> |                                                      |                             |

### **Annual Status Update on the Plan's Action Items**

The following table updates 160 actions itemized within the objectives listed above for 2025. Included are completed, ongoing and deferred actions. Most actions are ongoing because they are annual actions while other tasks have extensive work and resource needs, which existing staff and resources are limited in capacity to initiate. A primary agency is listed, and co-primary agencies and/or additional entities and parties are listed where applicable. Underlined agencies have the most involvement and/or resources and staffing.

|    |                                                                                                                                                                                          |           |                   |                                                                                                                                                                                                                                                                                                                                                                                          |                                       |          |                    |                                                                                                                                             |                                                                |                    |                    |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------|--------------------|
| 1  | <b>Floods</b>                                                                                                                                                                            |           |                   |                                                                                                                                                                                                                                                                                                                                                                                          |                                       |          |                    |                                                                                                                                             |                                                                |                    |                    |
| 2  | Mitigation Goals and Action Steps                                                                                                                                                        | Plan Year | Status of Project | Status Explanation                                                                                                                                                                                                                                                                                                                                                                       | Type of Mitigation Activity           | Priority | Date of Completion | Cost/Benefit & <u>2025 Annual Review/Update</u>                                                                                             | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source     |
| 3  | <b>Decrease the number of fatalities and injuries from flooding</b>                                                                                                                      |           |                   |                                                                                                                                                                                                                                                                                                                                                                                          |                                       |          |                    |                                                                                                                                             |                                                                |                    |                    |
| 4  | Explore and implement systems to protect drivers from flash flooding on roadways                                                                                                         | 2020      | Ongoing           | KCMO OEM, with other barricade departments, is exploring resources to improve roadway flash flooding protection.                                                                                                                                                                                                                                                                         | Structure and Infrastructure Projects | Medium   | Ongoing            | Poor Cost/Benefit on Automated Sites & Sensors, Signs + Depth best, Public use/success is LOW.                                              | <b><u>Water Services</u></b><br><i>Public Works<br/>Parks</i>  | Unknown            | Unknown            |
| 5  | Explore systems to improve and enhance flood warnings and flood warning systems                                                                                                          | 2020      | Ongoing           | KCMO is close to completion of the project to update its existing Alert 1 Data-loggers to Alert 2 Data-loggers and add water quality sensors at selected sites. The project is funded by American Rescue Plan Act (ARPA) grant. WSD continues to fund the operation and maintenance of a stream gauge on the Missouri River to explore improved methods and systems about flood warning. | Structure and Infrastructure Projects | Medium   | Ongoing, 2026      | Adding additional sites and sensors. ARPA grant partially funded.                                                                           | <b><u>Water Services</u></b><br><i>Public Works</i>            | \$1 million        | Partial ARPA grant |
| 6  | <b>Discourage new development in floodplain and flood prone areas</b>                                                                                                                    |           |                   |                                                                                                                                                                                                                                                                                                                                                                                          |                                       |          |                    |                                                                                                                                             |                                                                |                    |                    |
| 7  | **Levy fees on new residential, commercial, and infrastructure development in floodplains or flood prone areas to finance flood mitigation, preparedness, response, and recovery actions | 2015      | Deferred          | No fees currently exist; WSD may consider over the next 5 years.                                                                                                                                                                                                                                                                                                                         | Local Plans and Regulations           | Medium   | Deferred           | No Activity, ownership, legal structure, tax base, lack of staff, management, lack of business community support                            | <b><u>Water Services</u></b><br><i>Planning Dept.</i>          | Unknown            | Unknown            |
| 8  | <b>Enhance Health Department's ability to mitigate disease related issues caused by floods</b>                                                                                           |           |                   |                                                                                                                                                                                                                                                                                                                                                                                          |                                       |          |                    |                                                                                                                                             |                                                                |                    |                    |
| 9  | Enhance Health Department's ability to distribute mass medication before or after the onset of flood caused diseases through improved methods, training, and funding.                    | 2020      | Ongoing           | KCHD seeks enhancements to its ability to mass distribution of medication after a disaster. The department has identified the citizen registration process as an operational issue for further investigation and correction.                                                                                                                                                             | Education and Awareness Programs      | High     | Not Determined     | COVID-19 related support aided logistics, organization. Response, especially to floods, through methods, training and funding still needed. | <b><u>Health Dept.</u></b>                                     | Unknown            | Unknown            |
| 10 | Research methods and funding to enhance Health Department's ability to track diseases from flooding.                                                                                     | 2020      | Ongoing           | KCHD continues to research and refine its disease tracking protocols and looks for further funding to continue enhancing the investigative processes.                                                                                                                                                                                                                                    | Education and Awareness Programs      | Medium   | Ongoing            | No Activity                                                                                                                                 | <b><u>Health Dept.</u></b>                                     |                    |                    |
| 11 | Research methods and funding to enhance Health Department's inspection of food potentially contaminated by flood waters.                                                                 | 2020      | Ongoing           | KCHD continues to research food inspection and contamination protocols but could use additional funding to expand its efforts.                                                                                                                                                                                                                                                           | Education and Awareness Programs      | High     | Not Determined     | No Activity                                                                                                                                 | <b><u>Health Dept.</u></b>                                     | Unknown            | Unknown            |
| 12 | Research methods and funding to improve Health Department's processes for controlling disease vectors after a flood.                                                                     | 2020      | Ongoing           | KCHD continues to research disease vector control protocols and is in the process of hiring an Integrated Pest management manager for better facilitation. This could use additional funding to expand the efforts of vector control.                                                                                                                                                    | Education and Awareness Programs      | Medium   | Ongoing            | No Activity                                                                                                                                 | <b><u>Health Dept.</u></b>                                     |                    |                    |

|    |                                                                                                                                                                                                                                         |                  |                          |                                                                                                                                                                                                                                                                                                                                                                  |                                    |                 |                           |                                                                                                                                                                                                                                 |                                                                           |                           |                                      |
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| 1  | <b>Floods</b>                                                                                                                                                                                                                           |                  |                          |                                                                                                                                                                                                                                                                                                                                                                  |                                    |                 |                           |                                                                                                                                                                                                                                 |                                                                           |                           |                                      |
| 2  | <b>Mitigation Goals and Action Steps</b>                                                                                                                                                                                                | <b>Plan Year</b> | <b>Status of Project</b> | <b>Status Explanation</b>                                                                                                                                                                                                                                                                                                                                        | <b>Type of Mitigation Activity</b> | <b>Priority</b> | <b>Date of Completion</b> | <b>Cost/Benefit &amp; <u>2025 Annual Review/Update</u></b>                                                                                                                                                                      | <b>Primary Agency Responsible for Implementation &amp; Administration</b> | <b>Cost Estimate (\$)</b> | <b>Funding Source</b>                |
| 13 | <b>Enhance public awareness and education efforts related to flooding.</b>                                                                                                                                                              |                  |                          |                                                                                                                                                                                                                                                                                                                                                                  |                                    |                 |                           |                                                                                                                                                                                                                                 |                                                                           |                           |                                      |
| 14 | Encourage homeowners and businesses to purchase flood insurance.                                                                                                                                                                        | 2015             | Ongoing                  | Had the bill insert to our customers and 4 local major Relator offices, to encourage having flood insurance                                                                                                                                                                                                                                                      | Education and Awareness Programs   | High            | Ongoing                   | Letters mailed annually to owners in repetitive loss areas with contacts, web- links, FEMA publications & case for obtaining flood insurance with ICC coverage. Billing Insert to Water, Wastewater, & Stormwater Rate Payer's. | <b><u>Water Services</u></b>                                              | City existing re-sources  | Water Services, Emergency Management |
| 15 | Obtain brochures and related publications on flood mitigation, preparedness, response, and recovery from federal, state, and other organizations and provide them to homeowners and businesses in flood-prone areas.                    | 2015             | Ongoing                  | KCMO has obtained education materials from FEMA and distributed to all the public libraries within the City limits. KCMO also worked with the libraries to host a webpage dedicated to flood-related topics.<br><br>Sent out flood documents to 14 local libraries, 15 critical facilities, 43 parks/athletic fields offices, and 4 local major Relator offices. | Education and Awareness Programs   | High            | Ongoing                   | Letters mailed annually to owners in repetitive loss areas with contacts, web- links, FEMA publications & case for obtaining flood insurance with ICC coverage. Billing Insert to Water, Wastewater, & Stormwater Rate Payer's. | <b><u>Water Services</u></b>                                              | City existing re-sources  | Water Services, Emergency Management |
| 16 | Research and utilize social media to share weather forecasts and flood safety information                                                                                                                                               | 2015             | Ongoing                  | KCMO OEM partners with other agencies to provide the information via social media and messaging systems.                                                                                                                                                                                                                                                         | Education and Awareness Programs   | Medium          | Ongoing                   | OEM, continues to use social media for information and risk communication to neighborhoods.                                                                                                                                     | <b><u>Emergency Management</u></b>                                        |                           |                                      |
| 17 | <b>Enhance public awareness of the hazards associated with dam failures, as well as mitigation and preparedness activities</b>                                                                                                          |                  |                          |                                                                                                                                                                                                                                                                                                                                                                  |                                    |                 |                           |                                                                                                                                                                                                                                 |                                                                           |                           |                                      |
| 18 | Collect and disseminate public education materials to property owners near on in inundation pathways of dams that address dam safety, preparedness, and mitigation activities                                                           | 2015             | Ongoing                  | Started to partner with US Army Corps of Engineers to work on the Dam Breach Inundation Flood Risk Management Study.                                                                                                                                                                                                                                             | Education and Awareness Programs   | Low             | Ongoing                   | Unknown                                                                                                                                                                                                                         | Water Services                                                            | \$150K                    | USACE, City in-kind                  |
| 19 | Conduct a public education campaign to inform dam owners and citizens living near the inundation pathways of dams about the need to properly maintain and upgrade these structures - particularly those that are more than 50 years old | 2015             | Ongoing                  | In development                                                                                                                                                                                                                                                                                                                                                   | Education and Awareness Programs   | Low             | Ongoing                   | Unknown                                                                                                                                                                                                                         | Water Services                                                            |                           |                                      |
| 20 | Work with partners to conduct public education campaigns to inform citizens living near the inundation pathways of dams of the need to be familiar with the emergency action plans for these dams                                       | 2015             | Ongoing                  | In development                                                                                                                                                                                                                                                                                                                                                   | Education and Awareness Programs   | Low             | Ongoing                   | Unknown                                                                                                                                                                                                                         | Water Services                                                            |                           |                                      |
| 21 | <b>Enhance public awareness, outreach and education efforts related to flooding</b>                                                                                                                                                     |                  |                          |                                                                                                                                                                                                                                                                                                                                                                  |                                    |                 |                           |                                                                                                                                                                                                                                 |                                                                           |                           |                                      |
| 22 | During flood events, use public information officers and their tools along with the media to message risks from flooding.                                                                                                               | 2020             | Ongoing                  | Continue to examine improved methods to disseminate information regarding flood risks even before the event.                                                                                                                                                                                                                                                     | Education and Awareness Programs   | High            | Not Determined            | OEM continue to partner with City Communications for social media and messaging; utilize AlertKC (Everbridge) for messaging, and use integrated Public Alert Warning System for emergencies.                                    | Emergency Management                                                      | Unknown                   | Emergency Management                 |

|    |                                                                                                                                                                                                                       |                  |                          |                                                                                                                                                                                                                                                                                                                                                                  |                                    |                 |                           |                                                                                                                                                    |                                                                           |                           |                       |
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| 1  | <b>Floods</b>                                                                                                                                                                                                         |                  |                          |                                                                                                                                                                                                                                                                                                                                                                  |                                    |                 |                           |                                                                                                                                                    |                                                                           |                           |                       |
| 2  | <b>Mitigation Goals and Action Steps</b>                                                                                                                                                                              | <b>Plan Year</b> | <b>Status of Project</b> | <b>Status Explanation</b>                                                                                                                                                                                                                                                                                                                                        | <b>Type of Mitigation Activity</b> | <b>Priority</b> | <b>Date of Completion</b> | <b>Cost/Benefit &amp; <u>2025 Annual Review/Update</u></b>                                                                                         | <b>Primary Agency Responsible for Implementation &amp; Administration</b> | <b>Cost Estimate (\$)</b> | <b>Funding Source</b> |
| 23 | Encourage owners of structures to purchase flood insurance                                                                                                                                                            | 2020             | Ongoing                  | Mailed a bill insert with the monthly water service bill to 140,000 customers. Made the information accessible from local public libraries.                                                                                                                                                                                                                      | Education and Awareness Programs   | High            | Ongoing                   | Letters mailed annually to all the home owners with contacts, web-links, FEMA publications & case for obtaining flood insurance with ICC coverage. | <b><u>Water Service</u></b><br><i>floodplain manager</i>                  | City existing re-sources  | Water Services        |
| 24 | Identify funding resources for mechanisms to disseminate information to the public on all forms of flood risks for public awareness, outreach and education including health and disease associated with flood waters | 2020             | Ongoing                  | KCMO obtained hard copies of some topics directly from FEMA, downloaded online materials from FEMA and made copies to disseminate to some critical facilities, offices for parks and athletic fields, and at public meetings (Public Improvement Advisory Committee).<br><br>Three separate inserts were designed to target home owners, realtors and travelers. | Education and Awareness Programs   | High            | Ongoing                   | Created three brochures to distribute to home owners, realtors and travelers.                                                                      | <b><u>Water Services</u></b>                                              | City existing re-sources  | Water Services        |
| 25 | Obtain brochures and related publications on flood mitigation, preparedness, response and recovery from FEMA, SEMA, and other organizations and provide them to homeowners and businesses in flood-prone areas.       | 2020             | Ongoing                  | KCMO obtained hard copies of some topics directly from FEMA and also downloaded online materials from FEMA source to disseminate information. Developed its own brochures.                                                                                                                                                                                       | Education and Awareness Programs   | High            | Ongoing                   | Digital & Hardcopy provided and to be provided                                                                                                     | <b><u>Water Services</u></b><br>Emergency Management                      | City existing re-sources  | Water Services        |
| 26 | Provide a web link homepage that serves as a flood identification, response, and mitigation resources center of all the products available.                                                                           | 2020             | Completed                | Revamped the existing website to make it easy for viewers' navigation                                                                                                                                                                                                                                                                                            | Education and Awareness Programs   | High            | Ongoing                   | <a href="https://www.kcwater.us/programs/crs/">https://www.kcwater.us/ programs/crs/</a>                                                           | City Communications, Water Services                                       | City existing re-sources  | Water Services        |
| 27 | Use other public meetings on storm water to educate and provide these tools with information handed out to serve as links that help the public learn and act.                                                         | 2020             | Ongoing                  | Distributed the information in the public meetings                                                                                                                                                                                                                                                                                                               | Education and Awareness Programs   | High            | Sept. 2025                | Tag on scheduled public meetings to spread the messages                                                                                            | <i>Water Services</i>                                                     | City existing re-sources  | Water Services        |
| 28 | Work with Floodplain Management, Emergency Management, SEMA & FEMA to develop a public education program on identifying, planning, and mitigating flood risk that provides the public tools to see their options.     | 2020             | Ongoing                  | This is done on a regular basis. For this report term, KCMO partnered with US Geological Survey to work on the flood inundation mapping for the Blue River Watershed. The final product is expected to be posted on USGS website for public use.                                                                                                                 | Education and Awareness Programs   | High            | Ongoing                   | Mainly the City's own resources                                                                                                                    | Water Services                                                            | City existing re-sources  | Water Services        |
| 29 | <b>Enhance the ability to protect the public during flooding incidents to mitigate loss of life and property</b>                                                                                                      |                  |                          |                                                                                                                                                                                                                                                                                                                                                                  |                                    |                 |                           |                                                                                                                                                    |                                                                           |                           |                       |
| 30 | Improve KCPD's ability to assist with roadway                                                                                                                                                                         | 2020             | Ongoing                  | Ensure smooth and timely communication                                                                                                                                                                                                                                                                                                                           | Structure and                      | High            | Ongoing                   | Flood Depth grids built to identify potential flood risk properties for all flood                                                                  | <b><u>Water Services,</u></b>                                             | Unknown                   | Unknown               |

|  |                                                               |  |  |                                                                                                                                     |                         |  |  |                                                                                                                                                                |              |  |  |
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|  | flash flooding warnings to prevent loss of life and property. |  |  | between Police Dept. and Emergency Operations Center. Continue to improve and upgrade the Barricade Response System User interface. | Infrastructure Projects |  |  | events. Flood risk intersections identified. Built online Barricade Response System User interface. This interface needs to be modified per software upgrades. | Police Dept, |  |  |
|--|---------------------------------------------------------------|--|--|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--|--|

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| 1  | <b>Floods</b>                                                                                                                                                                                                    |                  |                          |                                                                                                                                                                                                                            |                                       |                 |                           |                                                                                                                                                                                         |                                                                           |                           |                                         |
| 2  | <b>Mitigation Goals and Action Steps</b>                                                                                                                                                                         | <b>Plan Year</b> | <b>Status of Project</b> | <b>Status Explanation</b>                                                                                                                                                                                                  | <b>Type of Mitigation Activity</b>    | <b>Priority</b> | <b>Date of Completion</b> | <b>Cost/Benefit &amp; <u>2025 Annual Review/Update</u></b>                                                                                                                              | <b>Primary Agency Responsible for Implementation &amp; Administration</b> | <b>Cost Estimate (\$)</b> | <b>Funding Source</b>                   |
| 31 | Provide training for officers to improve response capability during flooding incidents.                                                                                                                          | 2020             | Ongoing                  | Established continuous clarity on role’s responsibilities for different divisions (District, Traffic, Special Operations)<br><br>Seeking to provide training on the use of the Barricade Response System User interface.   | Education and Awareness Programs      | Medium          | Ongoing                   | Unknown                                                                                                                                                                                 | Police Dept                                                               | Unknown                   | Unknown                                 |
| 32 | <b>Enhance the capabilities of city departments with flood response duties to mitigate damage from floods</b>                                                                                                    |                  |                          |                                                                                                                                                                                                                            |                                       |                 |                           |                                                                                                                                                                                         |                                                                           |                           |                                         |
| 33 | Better leverage flood warning data that identifies flood risks likely to occur and the time left until they occur to help mobilize to mitigate or prevent threats to public safety known and time and resources. | 2020             | Ongoing                  | Upgrading 54 existing site dataloggers and adding additional sensors funded by ARPA grant. KCMO also allocated bond funding to upgrade the remaining existing site, as well as to add addition sites for the alert system. | Education and Awareness Programs      | High            | Ongoing                   | Adding additional sites and sensors.                                                                                                                                                    | <b><u>Water Services,</u></b><br>Public Works                             | Over 1.5 million          | Partial ARPA grant and bond funds       |
| 34 | Coordinate the city-wide flood barricade task force and update the SOP annually                                                                                                                                  | 2015             | Completed                | Flood Barricade Task Force meets at the beginning of every storm season.                                                                                                                                                   | Education and Awareness Programs      | High            | Ongoing                   | Completed                                                                                                                                                                               | Emergency Management, <i>Public Works</i>                                 | Unknown                   | General Fund                            |
| 35 | Develop an automated barricade tracking system for known community flood risks and where possible add warnings for these locations to aid in gaining time to respond before flooding and flood damages occur.    | 2020             | Deferred                 | KCMO had explored resources and built a system to improve roadway flash flooding protection. Due to funding challenges, it is not implementing.                                                                            | Structure and Infrastructure Projects | Not Specified   | Not Determined            | Water Services built 1-yr to 500-yr flood depth GIS. Identified ~ 700 barricade flood risk locations, citywide. Built ArcGIS Online response system. Inactive due to funding restraint. | <b><u>Water Services,</u></b><br><i>Public Works</i>                      | 1 million +               | Unknown                                 |
| 36 | Identify funding sources and replace damaged barriers to prevent traffic through high water areas thus mitigating the loss of life.                                                                              | 2020             | Ongoing                  | This is handled by individual responsible departments.                                                                                                                                                                     | Structure and Infrastructure Projects | Not Specified   | Not Determined            | FY26 Budget includes funding for replacement and for supplies, operations, maintenance of barricades in some cases.                                                                     | <b><u>Public Works, Parks &amp; Rec. Water Services,</u></b>              | City existing re-source   | City existing re-source                 |
| 37 | <b>Enhance the EOC capability to monitor and mitigate flood conditions</b>                                                                                                                                       |                  |                          |                                                                                                                                                                                                                            |                                       |                 |                           |                                                                                                                                                                                         |                                                                           |                           |                                         |
| 38 | Coordinate with Water Dept., dam stakeholders, and other groups associated with dam operations                                                                                                                   | 2015             | Ongoing                  | WSD regularly meet with USACE and KCMO Levee Committee                                                                                                                                                                     | Structure and Infrastructure Projects | High            | Ongoing                   | Improved Dam Risk identification is deferred due to funding and staffing limits.                                                                                                        | Water Services                                                            |                           |                                         |
| 39 | Develop a contact list for agencies/individuals involved with dam operations                                                                                                                                     | 2015             | Ongoing                  | Starting to partner with USACE                                                                                                                                                                                             | Structure and Infrastructure Projects | Medium          | Started                   | Working with USACE to work on the dam breach inundation project                                                                                                                         | Water Services                                                            | >\$150K                   | USACE fund, and City existing re-source |

|    |                                                         |      |         |                                                                                                                                                                                                                                                                                                                                     |                                  |        |         |                                                                                                                                                                                                     |                |          |  |
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| 40 | Explore and implement systems to improve flood warnings | 2015 | Ongoing | Specific effort was taken for Swope Park Industrial area. WSD built in a combination of warnings and an SOP and emergency response system for local stakeholders to get alarms and evacuate timely.<br><br>Migrating from Contrail to Elements 360 system for more powerful real-time flood early warning and situational awareness | Education and Awareness Programs | Medium | Ongoing | Water Services built 1-yr to 500-yr flood depth GIS. Identified ~ 700 barricade flood risk locations, citywide. Built ArcGIS Online response system. Upgrading the software for better forecasting. | Water Services | WSD fund |  |
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| 1  | <b>Floods</b>                                                                                                                                   |                  |                          |                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                                                     |                                                                           |                           |                         |
| 2  | <b>Mitigation Goals and Action Steps</b>                                                                                                        | <b>Plan Year</b> | <b>Status of Project</b> | <b>Status Explanation</b>                                                                                                                                                                                                                     | <b>Type of Mitigation Activity</b>    | <b>Priority</b> | <b>Date of Completion</b> | <b>Cost/Benefit &amp; <u>2024 Annual Review/Update</u></b>                                                                                          | <b>Primary Agency Responsible for Implementation &amp; Administration</b> | <b>Cost Estimate (\$)</b> | <b>Funding Source</b>   |
| 41 | Upgrade and enhance the surveillance capability of the EOC to monitor flood conditions                                                          | 2015             | Ongoing                  | The system has been upgraded over the last 5 years. However, new technology means that this action will be ongoing.                                                                                                                           | Structure and Infrastructure Projects | Medium          | Ongoing                   | Ongoing Operations, maintenance, and improvements along with System sharing agreements through Emergency Management contracts and resource sharing. | Emergency Management                                                      | Unknown                   | General Fund            |
| 42 | <b>Ensure continued operability of dam to prevent failure and resulting damage to the MCI facilities.</b>                                       |                  |                          |                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                                                     |                                                                           |                           |                         |
| 43 | Enhance environmental control and erosion prevention to maintain the integrity of the KCI dam.                                                  | 2015             | Ongoing                  | Work is done on needed base.                                                                                                                                                                                                                  | Structure and Infrastructure Projects | High            | Completed                 | Ongoing                                                                                                                                             | Aviation                                                                  | 278,138                   | Aviation                |
| 44 | <b>Ensure levee requirements and integrity are maintained to prevent damage from flooding due to levee failure</b>                              |                  |                          |                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                                                     |                                                                           |                           |                         |
| 45 | Coordinate with US Army Corps of Engineers to ensure best practices and operations are utilized to maintain levees against failure and flooding | 2015             | Ongoing                  | WSD maintains a continual partnership with the US Army Corps. on all facility needs and improvement efforts.                                                                                                                                  | Local Plans and Regulations           | High            | Ongoing                   | Ongoing                                                                                                                                             | Water Services                                                            |                           |                         |
| 46 | Identify and conduct training for levee inspectors to ensure levee integrity to prevent flooding                                                | 2015             | Ongoing                  | Multiple city employees including plant operators, engineers, and maintenance staff receive trainings: every two years or as needed base.                                                                                                     | Structure and Infrastructure Projects | High            | Ongoing                   | Ongoing                                                                                                                                             | Water Services                                                            | <\$1k                     | Water                   |
| 47 | Perform inspections and assessments of levees and levee systems to track deficiencies and prevent levee failure and flooding                    | 2015             | Ongoing                  | This is done every five years with the Us Army Corps. This periodical inspection includes walking along the levees, going into each pump station and running pumps and exercising gates, identify improvements in operations and maintenance. | Structure and Infrastructure Projects | High            | Ongoing                   | Ongoing                                                                                                                                             | Water Services                                                            | City existing re-source   | City existing re-source |
| 48 | <b>Examine repetitive flood loss properties and determine feasible and practical mitigation options</b>                                         |                  |                          |                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                                                     |                                                                           |                           |                         |
| 49 | As funding allows, repetitive flood loss properties and structures will be targeted for buyout                                                  | 2015             | Ongoing                  | In the previous report, cancellation for funding application has been made for the 20 properties, which had been identified in the Town Fork Creek Buyout Project, due to federal policy                                                      | Local Plans and Regulations           | High            | Ongoing                   | Stopped                                                                                                                                             | <b><u>Water Services</u></b>                                              | Unknown                   |                         |

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|    |                                                                                                                                                                                                   |                  |                          | changes. This remains unchanged.                                                                                                                                                                                                                                                                                                                                             |                                       |                 |                           |                                                                                                                                                                                              |                                                                           |                           |                       |
| 50 | **Identify potential funding opportunities to implement mitigation options for repetitive flood loss properties                                                                                   | 2015             | Ongoing                  | Funding application has been cancelled.                                                                                                                                                                                                                                                                                                                                      | Local Plans and Regulations           | Low             | Ongoing                   | A GIS database layer has been created for these properties listed in (item 49) and their progress will be monitored for future losses.                                                       | <b><u>Water Services,</u></b><br>Floodplain Manager                       | Unknown                   | Unknown               |
| 51 | **With stakeholders, explore incentive options to encourage property owners to take action to prevent or reduce future flood losses                                                               | 2015             | Ongoing                  | New development is subject to floodplain development review process. The incentive options have not been explored.                                                                                                                                                                                                                                                           | Local Plans and Regulations           | Medium          | Ongoing                   |                                                                                                                                                                                              | Floodplain Manager                                                        | Unknown                   | Unknown               |
| 1  | <b>Floods</b>                                                                                                                                                                                     |                  |                          |                                                                                                                                                                                                                                                                                                                                                                              |                                       |                 |                           |                                                                                                                                                                                              |                                                                           |                           |                       |
| 2  | <b>Mitigation Goals and Action Steps</b>                                                                                                                                                          | <b>Plan Year</b> | <b>Status of Project</b> | <b>Status Explanation</b>                                                                                                                                                                                                                                                                                                                                                    | <b>Type of Mitigation Activity</b>    | <b>Priority</b> | <b>Date of Completion</b> | <b>Cost/Benefit &amp; <u>2025 Annual Review/Update</u></b>                                                                                                                                   | <b>Primary Agency Responsible for Implementation &amp; Administration</b> | <b>Cost Estimate (\$)</b> | <b>Funding Source</b> |
| 52 | **Work with owners of repetitive flood loss properties to identify feasible mitigation strategies and potential opportunities; determine property owners' interest in specific mitigation options | 2015             | Ongoing                  | A total of 149 repetitive loss properties were identified; Letters are to be sent out to the inform the property owners about the importance of obtaining flood insurance, measures to be taken for preparation of flooding and potential financial support. More customized discussions have not been planned.                                                              | Local Plans and Regulations           | Medium          | Ongoing                   | Mailers and online website list contacts and e- mails that route queries to CRS Coordinator, who manages all support, Q&A, education, field visits etc. Map products are provided to inform. | <b><u>Water Services,</u></b><br>Floodplain Manager                       | Unknown                   | Unknown               |
| 53 | <b>Expand KCPD's ability to assist with life safety operations during flooding</b>                                                                                                                |                  |                          |                                                                                                                                                                                                                                                                                                                                                                              |                                       |                 |                           |                                                                                                                                                                                              |                                                                           |                           |                       |
| 54 | Acquire additional equipment necessary to participate in and conduct swift water rescues                                                                                                          | 2020             | Ongoing                  | This is pursued as funding becomes available.                                                                                                                                                                                                                                                                                                                                | Other                                 | High            | Not Determined            | unknown                                                                                                                                                                                      | Fire                                                                      | Unknown                   | Unknown               |
| 55 | KCPD to enhance partnership with KCFD to participate in swift water training and rescues                                                                                                          | 2020             | Ongoing                  | This action will be examined and implemented as applicable and available.                                                                                                                                                                                                                                                                                                    | Education and Awareness Programs      | Medium          | On going                  | unknown                                                                                                                                                                                      | Police                                                                    | Unknown                   | Unknown               |
| 56 | <b>Implement or improve flood warning systems</b>                                                                                                                                                 |                  |                          |                                                                                                                                                                                                                                                                                                                                                                              |                                       |                 |                           |                                                                                                                                                                                              |                                                                           |                           |                       |
| 57 | Determine the need for stream gauges in waterways currently lacking flood warning systems or additional stream gauges in waterways with flood warning systems already in place                    | 2015             | Ongoing                  | KCMO currently has 64 stream gauges with an ongoing effort to expand the site number as funding has been allocated.                                                                                                                                                                                                                                                          | Structure and Infrastructure Projects | High            | 2024                      | Using ARPA grant to upgrade dataloggers and adding additional sensors at selected sites. Using new GO bond fund to increase alert sites.                                                     | <b><u>Water Services</u></b>                                              | 1 million +               | Partial ARPA fund     |
| 58 | Develop and implement procedures to quickly analyze and disseminate information from flood warning systems to the public                                                                          | 2015             | Ongoing                  | The data service for the flood warning system is migrating from Contrail to Elements 360 for a more powerful and seamless real-time forecast. The real-time data can continue to be accessible from a regional portal. Also completing the Inundation Mapping for the Blue River Watershed and the modeling tool will be posted on the USGS online portal for public access. | Education and Awareness Programs      | High            | Ongoing                   | Streamlining 1,000's of warnings in Contrail that are Text/cell and/or e-mail based; public facing website, and public availability of developed warnings is best path.                      | <b><u>Water Services,</u></b><br>Emergency Management                     | 1 million +               | Unknown               |
| 60 | Develop information from the flood, stage, and risk data into KCMO's flood warning system                                                                                                         | 2020             | Ongoing                  | KCMO is cooperating with US Geological Survey to revise flood-inundation maps for                                                                                                                                                                                                                                                                                            | Education and Awareness               | High            | Ongoing, 2026             | Integrating FEMA/City-USGS developed flood depth risks for roads, buildings,                                                                                                                 | <b><u>Water Services,</u></b><br>Emergency                                | 1 million +               | Water Department      |

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|    | software.                                                                                                                                                                                                            |      |         | the Blue River and its two major tributaries. The output from this effort will provide updated and refined water depth of these streams.<br><br>KCMO is also working on a survey project that calibrates the datum of each flood warning site per USGS reference standard. The result will improve our forecast accuracy and consistency across the sites. | Programs                         |      |               | parking lots for 10-yr to 500-yr events. | Management                                            |             |         |
| 61 | Develop stage and gauge data to correlate from events with downstream risks and as modeling improved develop stage/flood elevation triggers that lead to downstream flooding of roads, structures, and parking lots. | 2020 | Ongoing | Major work was done through the base level engineering project for Indian Creek and Dykes Branch watersheds, and is being done through the Inundation Mapping of the Blue River and tributaries.                                                                                                                                                           | Education and Awareness Programs | High | Ongoing, 2026 |                                          | <b><u>Water Services,</u></b><br>Emergency Management | 1 million + | Unknown |

| 1  | Floods                                                                                                                                                                                                                                       |           |                   |                                                                                                                                                                                                                                                                     |                                       |          |                    |                                                                                                                  |                                                                |                    |                |
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| 2  | Mitigation Goals and Action Steps                                                                                                                                                                                                            | Plan Year | Status of Project | Status Explanation                                                                                                                                                                                                                                                  | Type of Mitigation Activity           | Priority | Date of Completion | Cost/Benefit & <u>2025 Annual Review/Update</u>                                                                  | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source |
| 62 | Use improved flood hazard and flood risk data, develop flow path data, time to crest data, and flood risk data to determine best locations for additional stream gauges and develop better warnings for all gauges to improve response time. | 2020      | Ongoing           | One new site on Indian Creek has been identified. Design and construction are to be started.                                                                                                                                                                        | Education and Awareness Programs      | High     | Ongoing            | Integrating FEMA/City developed flood depth risks for roads, buildings, parking lots for 10-yr to 500-yr events. | <b><u>Water Services,</u></b><br>Emergency Management          | <\$0.5 million     | City           |
| 63 | Work with local governments and other stakeholders to share data from flood warning systems in multiple jurisdictions                                                                                                                        | 2015      | Ongoing           | KCMO currently shares data publicly and also on a regional level, with multiple neighboring communities, as well as NOAA office.                                                                                                                                    | Education and Awareness Programs      | High     | Ongoing            | Ongoing, OPKS, UG, JOCO, KS & KCMO all share telemetry data for all sites and sensors.                           | <b><u>Water Services,</u></b>                                  | Unknown            | City           |
| 65 | Implement projects and procedures to enhance resiliency of KCMO infrastructure against flood damage                                                                                                                                          |           |                   |                                                                                                                                                                                                                                                                     |                                       |          |                    |                                                                                                                  |                                                                |                    |                |
| 66 | Complete a Repetitive Loss Area Analysis to determine Risk and Benefits.                                                                                                                                                                     | 2020      | Ongoing           | Funding is allocated to conduct this analysis.                                                                                                                                                                                                                      | Education and Awareness Programs      | High     | Planned            | Funding is allocated.                                                                                            | <b><u>Water Services,</u></b>                                  | Unknown            | City           |
| 67 | Improve roadway structure to mitigate damage from flooding                                                                                                                                                                                   | 2020      | Ongoing           | Ditches in the Right-of-way and culverts are being maintained.                                                                                                                                                                                                      | Structure and Infrastructure Projects | High     | ongoing            | As Public Works completes bridges, they meet criteria                                                            | Public Works                                                   | Unknown            | City           |
| 68 | Provide enhancement to existing and new structures to improve flooding resiliency                                                                                                                                                            | 2020      | Ongoing           | Bank stabilization and channel enhancement are done on needed basis and as funding permit. An example is the rehabilitation of the opening concrete channel along 117 <sup>th</sup> St between Holms and Wornall.<br><br>Pending on federal funding to working with | Structure and Infrastructure Projects | High     | Ongoing            |                                                                                                                  | Public Works                                                   | >\$1 million       | City           |

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|    |                                                                                                                      |      |          | USACE on the Brush Creek Basin Project to implement the previously developed Brush Creek Feasibility Study and Ecosystem Restoration.<br><br>Working with six local community, MARC and USACE on the Little Blue River Flood Risk Management Study |                                       |               |                |                                                                                |                                                |         |         |
| 69 | Reroute channels to alleviate overflow and mitigate against flooding                                                 | 2020 | Ongoing  | Considered as needed                                                                                                                                                                                                                               | Structure and Infrastructure Projects | High          | Not Determined | USACE Flood Control Program Implements major corridor.                         | Public Works Water Services                    | Unknown | Unknown |
| 70 | Research funding to implement flood mitigation procedures and projects                                               | 2020 | Ongoing  | Working with six local community, MARC and USACE on the Little Blue River Flood Risk Management Study and to obtain funding                                                                                                                        | Structure and Infrastructure Projects | High          | Ongoing        | Continue working with USACE on mitigation.                                     | Public Works                                   | Unknown | Unknown |
| 71 | Research funding to support and educate that flood insurance coverage should be mandatory on all primary structures. | 2020 | Deferred | This action will be pursued, but there is no schedule at this time.                                                                                                                                                                                | Not Specified                         | Not Specified | Deferred       | Possible to obtain funding through CTP Program from FEMA R7 by Water Services. | <b><u>Water Services,</u></b><br>Planning Dept | Unknown | Unknown |

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| 1  | <b>Floods</b>                                                                                                                                                                                                                                  |                  |                          |                                                                                                     |                                       |                 |                           |                                                                                                                                                      |                                                                                    |                           |                       |
| 2  | <b>Mitigation Goals and Action Steps</b>                                                                                                                                                                                                       | <b>Plan Year</b> | <b>Status of Project</b> | <b>Status Explanation</b>                                                                           | <b>Type of Mitigation Activity</b>    | <b>Priority</b> | <b>Date of Completion</b> | <b>Cost/Benefit &amp; <u>2024 Annual Review/Update</u></b>                                                                                           | <b>Primary Agency Responsible for Implementation &amp; Administration</b>          | <b>Cost Estimate (\$)</b> | <b>Funding Source</b> |
| 72 | Support and push for more funding in FEMA Flood Insurance Policies for Increased Cost of Compliance to assist structures substantially damaged by flooding in rebuilding in a manner that will meet NFIP regulatory and/or Local requirements. | 2020             | Ongoing                  | This action is pursued, but the completion date is based on external agency schedules.              | Education and Awareness Programs      | High            | Ongoing                   | KCMO, Water Services, as a CTP to FEMA R7, has communicated these items through reports, findings, and related FEMA CTP funded efforts.              | <b><u>Water Services,</u></b>                                                      | Unknown                   | Unknown               |
| 73 | <b>Improve and enhance the capability to respond to and mitigate damage from flooding incidents</b>                                                                                                                                            |                  |                          |                                                                                                     |                                       |                 |                           |                                                                                                                                                      |                                                                                    |                           |                       |
| 74 | Identify funding sources and replace damaged barriers to prevent traffic through high water areas thus mitigating the loss of life.                                                                                                            | 2015             | Ongoing                  | Each department paid out of own budget to obtain new barricades; will carry over into the 2020 plan | Structure and Infrastructure Projects | Medium          | Ongoing                   | Annual maintenance budget replaces damaged barricades.                                                                                               | <b>Public Works, Parks &amp; Rec., Water Services, <i>Emergency Management</i></b> | Unknown                   | City                  |
| 75 | <b>Improve community resiliency to flooding</b>                                                                                                                                                                                                |                  |                          |                                                                                                     |                                       |                 |                           |                                                                                                                                                      |                                                                                    |                           |                       |
| 76 | Provide critical services facilities (e.g., nursing homes) with oversight on floodplain management (evacuation plans, discourage building in flood plains, etc.)                                                                               | 2020             | Ongoing                  | This action has been pursued, but there is no schedule for a defined SOP at this time.              | Education and Awareness Programs      | Medium          | Not Determined            | Critical Facilities are not allowed to be constructed below the 100-yr BFE + 1 foot of freeboard. Historic footprint from past development practices | Planning Dept, Floodplain Management                                               | Unknown                   | Unknown               |

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| 77 | Improve flood hazard assessments and flood mapping                                                                                                         |      |          |                                                                                                                                                               |                                  |      |          |                                                                                                                                                                                                                                                          |                                                 |         |         |
| 78 | Conduct an in-depth flood risk analysis utilizing HAZUS data and create detailed maps based on GIS technology to identify areas at risk from flooding      | 2015 | Deferred | Action unable to be completed due to limited staffing and funding.                                                                                            | Education and Awareness Programs | High | Deferred | unknown                                                                                                                                                                                                                                                  | <b><u>Water Services</u></b>                    | Unknown | Unknown |
| 79 | **Coordinate the collection of demographics, economic, watershed, land use, and other data required by the HAZUS-Flood software program and/or GIS systems | 2015 | Ongoing  | Many sources for HAZUS exist. KCMO completed data compilation. The data, however, does change over time, so this project will carry forward to the 2020 plan. | Education and Awareness Programs | High | Ongoing  | FEMA CTP funded grant dollars for UMKC GIS Analysis work developed demographic, economic, watershed, land use data. SEMA completed advanced HAZUS analysis for KCMO, but aggregates to census track. Data is needed by structure, road, parking lot etc. | <b><u>Water Services</u></b> ,<br>Planning Dept | Unknown | Unknown |

|    |                                                                                                                                                                           |           |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |          |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                |                    |                             |
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| 1  | Floods                                                                                                                                                                    |           |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |          |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                |                    |                             |
| 2  | Mitigation Goals and Action Steps                                                                                                                                         | Plan Year | Status of Project | Status Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Type of Mitigation Activity           | Priority | Date of Completion             | Cost/Benefit & <u>2024 Annual Review/Update</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source              |
| 80 | Develop and regularly update a mitigation list for structures, land/parcels, and roads/RoWs with a ranking for these based on depth, severity, and frequency of flooding. | 2015      | Ongoing           | This list is 95% complete for 1) Regulatory FEMA flood Risks, however FEMA's Mitigation Tracker continues to be a one entry system, vs. a database upload by geospatial fields. Due to this KCMO has been unable to move our 11,819 identified community flood risks into FEMA/SMEA systems to improve identification efforts and support for mitigation post disasters. Ultimately KCMO still desires to make this data into an ongoing Notice of Intent in Mass to SEMA/FEMA for risks to have more ability to mitigate flood risks post disaster or through other supporting grant methods. | Education and Awareness Programs      | High     | Ongoing                        | FAST based 10-yr, 25-yr, 50-yr, 100-yr, 500-yr Cost vs. benefit for structures, parking and eventually roads being developed. FAST = FEMA software = version 0.1.x FEMA Hazus Team is fixing issues KCMO, and others have reported that prevent mass runs of large tabulated/GIS datasets. The need for this damage/cost vs.Benefit analysis is HIGH, lowering City CIP costs while enlarging the benefits and mitigation a project can achieve. Note, existing data ID's only 20% of community wide flood risks. The rest is unidentified no Cost vs. Benefit. | <b><u>Water Services</u></b> ,<br>Public Works                 | Unknown            | Unknown                     |
| 81 | **Obtain parcel data for flood boundary areas and enhance vulnerability assessments for these areas                                                                       | 2015      | Ongoing           | Parcel data, particularly ownership, is constantly changing. Therefore, this is an ongoing action as the data fluctuates.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Structure and Infrastructure Projects | High     | Ongoing and completed annually | Repetitive Loss Area's listing is updated annually, reanalyzed and sent to owner's within RLA's.                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b><u>Water Service</u></b> ,<br>Public Works                  | Unknown            | Unknown                     |
| 82 | Update City Stream Buffers based on new regulatory and non-regulatory products' 1% severity or better                                                                     | 2015      | Ongoing           | Discussions have been occurring between CPD and WSD on these efforts.<br><br>A second round of Stream Asset Inventory effort is ongoing with the City in partnership with Corps of Engineers. The result will be the base for the buffer regulation update.                                                                                                                                                                                                                                                                                                                                    | Local Plans and Regulations           | High     | Ongoing                        | Working on the Stream Asset Inventory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Water Services                                                 | >\$200K            | City and Corps of Engineers |

|    |                                                                                                                                                                                                                                       |      |         |                                              |                             |      |         |                                                                                                                                                                              |                |         |         |
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| 83 | Use products that classify, identify, and weigh community flood risks and the technological tools developed for them to improve regulation and information sharing to get enhanced mitigation, improvements, and future developments. | 2015 | Ongoing | Due to limited staff resources, no progress. | Local Plans and Regulations | High | Ongoing | This is on hold now due to staffing and limited resources, requiring additional steps in series to be completed to allow improved regulations and better protect the public. | Water Services | Unknown | Unknown |
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| 1  | Floods                                                                                                                                                                                                                                                                                                                                                                                                    |           |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |          |                    |                                                                                                                                                                                                                                                                                                                                               |                                                                |                    |                |
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| 2  | Mitigation Goals and Action Steps                                                                                                                                                                                                                                                                                                                                                                         | Plan Year | Status of Project | Status Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Type of Mitigation Activity      | Priority | Date of Completion | Cost/Benefit & <u>2024 Annual Review/Update</u>                                                                                                                                                                                                                                                                                               | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source |
| 84 | Using city, state, and federal products complete the modernization of city regulatory and non-regulatory floodplains and adopt by the three phases outlined in Action #4 over time                                                                                                                                                                                                                        | 2015      | Ongoing           | Atlas 14 and PC-SWMM are used for closed systems and HEC-RAS for Little Blue River projects. SEMA has addressed Little Blue River data development comments. Data development is nearly complete. Preliminary mapping tasks have not been funded. SEMA has not worked on Blue River floodplain. The work will not be initiated until the headwaters in Kansas are studied so that SEMA can tie-in the project.                                                                    | Education and Awareness Programs | High     | Ongoing            | SEMA MO CTP and FEMA has nearly completed the data development for the Little Blue River floodplains to Atlas 14 with 2D Hec-Ras and PC/EPA-SWMM allowing attenuation & storage. preliminary mapping tasks have not been funded. Work on the Blue River floodplain has not been initiated until a study is done for the headwaters in Kansas. | Water Services                                                 | Unknown            | Unknown        |
| 85 | Using city, state, and federal products develop, analyze, and prioritize flood risk, severity, and frequency for structures, land/parcels, and roads/RoWs.<br><br>Continuously improve with 3 key phases of development by: 1.) Regulatory floodplain areas, 2.) Non- regulatory flood risk Areas 3.) Upstream Hydrologic Areas without hydraulics using flow accumulation pathways to 0.5-acre drainage. | 2015      | Ongoing           | 1) Floodplain Areas has been completed for 95% of FEMA Regulatory Zones in KCMO for 10%, 4%, 2%, 1% and 0.2% annual chance storms. This covers less than 33% of the City's territory though, as Regulatory floodplain stops on tributaries smaller than 1 square mile. 2) Non-Regulatory has tested new 2D methods in 33 square miles of KCMO including Second Cr., First Cr., and the Northeast Industrial District. Additional analysis can be done for East Bottom Levee area. | Education and Awareness Programs | High     | Ongoing            | This effort is on-going and continues to improve as more mature models and GIS data become available, i.e. SWMM and HECRAS models. With these, flooding predictions can be made and analyzed for future risk planning.                                                                                                                        | Water Services                                                 | Unknown            | Unknown        |
| 86 | Work to develop these map, data, and list products for GIS tools for direct use by public and private needs to fulfill multiple needs for information to aid flood mitigation                                                                                                                                                                                                                             | 2015      | Ongoing           | This has not begun due to ongoing development of the tools and products as discussed above.<br><br>Products will remain internal for some time. Disclaimer requirements will exist when these flood risks are made available. Since the data is being developed this is an ongoing effort.                                                                                                                                                                                        | Education and Awareness Programs | High     | Ongoing            | Many products developed, under development and partially developed.<br><br>More testing required for accuracy prior to public release.                                                                                                                                                                                                        | Water Services                                                 | Unknown            | Unknown        |
| 87 | Improve flood hazard assessments and flood mapping to assist in mitigating damage from flooding                                                                                                                                                                                                                                                                                                           |           |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |          |                    |                                                                                                                                                                                                                                                                                                                                               |                                                                |                    |                |

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| 88 | Classify, identify, analyze, and weigh community flood risks to improve regulation, analysis, identification, prevention, mitigation, improvements, and future development in ways that avoid flood risk. | 2020 | Ongoing | This action generally involves an extensive project; no completion date is foreseeable currently. However, KCMO continues to partner with six neighboring cities and a county to work with USACE to conduct a study to analyze flood risks and formulated mitigation strategies for the Little Blue River basin | Education and Awareness Programs | High | Ongoing | A collaborative effort between KCMO departments and external agencies to provide local data and ideas for the study. | Water Services | Unknown | Unknown |
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| 1  | Floods                                                                                                                                                                                                              |           |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |          |                    |                                                                                                                                                                                                                                                     |                                                                |                    |                        |
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| 2  | Mitigation Goals and Action Steps                                                                                                                                                                                   | Plan Year | Status of Project | Status Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Type of Mitigation Activity | Priority | Date of Completion | Cost/Benefit & <u>2025 Annual Review/Update</u>                                                                                                                                                                                                     | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source         |
| 89 | Develop 1D/2D flood risk products for: 1.) Regulatory floodplain areas, 2.) Non-regulatory flood risk Areas 3.) Upstream Hydrologic Areas without hydraulics using flow accumulation pathways to 0.5 acre drainage. | 2020      | Ongoing           | KCMO is collaborating with USGS, using 2D HEC-RAS modeling and GIS to update the flood inundation maps for Blue River and its two tributaries – Brush Creek and Indian Creek. The final product will include a rasterized, discharge, flood elevation, flood depth, travel time and use inundation floodplains of 1 ft. increments or higher resolution to show flooding state with flood crest travel downstream on all systems. It will provide public knowledge and Emergency Management response to flooding with approximately 12 hours of lead time (maybe more) made possible from NOAA, USGS, Flood warning and USGS gages and River Forecasting. The product will identify flood extents, risks, need for evacuation, estimated time remaining to evacuate and provide the needed data for infrastructure, bridges, roads and structure flooding | Local Plans and Regulations | High     | Ongoing            | Used new 2D Hec-Ras modeling from FEMA, to provide: rasterized, will identify flood extents, risks, need for evacuation, estimated time remaining to evacuate and provide the needed data for infrastructure, bridges, roads and structure flooding | Water Services                                                 | >\$0.5 million     | City                   |
| 90 | Develop 1D/2D modeling paradigms and procedures to fully identify all community flood risk for all the community.                                                                                                   | 2020      | Ongoing           | Only did for Blue River Watersheds and the Little Blue River Watersheds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Local Plans and Regulations | High     | Ongoing            | Ongoing                                                                                                                                                                                                                                             | Water Services                                                 | Unknown            | Unknown                |
| 91 | Research and implement improvements to the language of Chapter 61 and adopt these new 1D/2D models, studies, and identified flood risks in there complete geospatial and modeling forms.                            | 2020      | Ongoing           | This action is based on the previous action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Local Plans and Regulations | High     | Deferred           | unknown                                                                                                                                                                                                                                             | Water Services                                                 | Unknown            | Unknown                |
| 92 | Update the City Stream Buffers using the above products with appropriate scientifically grounded methods to protect the community and public.                                                                       | 2020      | Ongoing           | Water Services Department is collaborating with USACE to conduct a 2 <sup>nd</sup> round of a city-wide stream asset inventory. The 1 <sup>st</sup> round was conducted in 2002-2005, the result of which formed the scientific base for                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Local Plans and Regulations | High     | Ongoing            | Updating the stream buffer will require the use of ortho imagery to recreate the stream centerline layer in GIS. The task of recreating and verifying the stream centerline will take                                                               | Water Services                                                 | \$0.5 million      | City, USACE and US EPA |

|    |                                                                                                                                                     |      |         |                                                                                                                                                                                                                                                                                                                                                                                                     |                             |      |         |                                                                                            |                |         |      |
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|    |                                                                                                                                                     |      |         | <p>the Stream Buffer Ordinance. The current effort is anticipated to help to update the stream buffer.</p> <p>Water Services is also working on the project Updating the National Wetland Inventory of the HUC-12 Watersheds in KCMO. The project is funded by USEPA and the result will benefit this task.</p>                                                                                     |                             |      |         | approximately 18 months to complete, from project conception and SOW to final deliverable. |                |         |      |
| 93 | Use 1D/2D modeling methods and further geospatial analysis to identify flood depth, velocity, storage, shear stress risks for all flood risk areas. | 2020 | Ongoing | <p>Has an ongoing project that is developing a digital twin and live modeling system for the stormwater network, leveraging existing stormwater sensor network (StormWatch) and the FEMA hydraulic model.</p> <p>This task involves establishing a continuous, live, and forecasting simulation model for owned/operated sites, integrating real-time data collection and predictive analytics.</p> | Local Plans and Regulations | High | Ongoing | Ongoing                                                                                    | Water Services | \$150 K | City |

| 1  | Floods                                                                                                                                                                                             |           |                   |                                                                               |                             |          |                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                |                    |                |
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| 2  | Mitigation Goals and Action Steps                                                                                                                                                                  | Plan Year | Status of Project | Status Explanation                                                            | Type of Mitigation Activity | Priority | Date of Completion | Cost/Benefit & <u>2025 Annual Review/Update</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source |
| 94 | Use the modeling products developed to improve FEMA based HAZUS and BCA Analysis of flood risks and costs vs. benefits of mitigation /prevention within the community.                             | 2020      | Ongoing           | This action is based on the previous action listed in Row 89.                 | Local Plans and Regulations | High     | Ongoing            | <p>FAST based 10-yr, 25-yr, 50-yr, 100-yr, 500-yr Cost vs. benefit for structures, parking and eventually roads being developed. FAST = FEMA software = version 0.1.x<br/>FEMA Hazus Team is fixing issues KCMO, and others have reported that prevent mass runs of large tabulated/GIS datasets. The need for this damage/cost vs. Benefit analysis is HIGH, lowering City CIP costs while enlarging the benefits and mitigation a project can achieve.</p> <p>Note, existing data ID's only 20% of community wide flood risks. The rest is unidentified no Cost vs. Benefited. High Benefits vs. Cost = Grants.</p> | Water Services                                                 | Unknown            | Unknown        |
| 95 | Using the 1D/2D modeling methods and further geospatial analysis identify areas of erosive, slope or meander-based risk to add to flood risk knowledge to support development risk identification. | 2020      | Ongoing           | Staring the project Indian Creek Flood Risk Reduction & Erosion Control Study | Local Plans and Regulations | High     | Ongoing            | Project will evaluate the existing stormwater conditions along Indian Creek from State Line Road to 99th Street using a 2D hydrologic and hydraulic (H&H) model to simulate a range of storm events. 2D modeling will define flood risk reduction alternatives and define erosion issues along Indian Creek from State Line Road to E. 99th Street Road using a                                                                                                                                                                                                                                                       | Water Services                                                 | \$150K             | Cit            |

|     |                                                                                                                                                            |      |         |                                                                           |                                       |        |         |                                                        |                |         |         |
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|     |                                                                                                                                                            |      |         |                                                                           |                                       |        |         | comprehensive watershed approach                       |                |         |         |
| 96  | Work to develop list products as GIS tools for direct use by public and private parties to fulfill multiple needs for information to aid flood mitigation. | 2020 | Ongoing | This action is based on the previous action listed in Row 89.             | Education and Awareness Programs      | High   | Ongoing | Ongoing, further support from IT, GIS Division needed. | Water Services | Unknown | Unknown |
| 97  | Improve hazard assessment information for dams within Kansas City, MO                                                                                      |      |         |                                                                           |                                       |        |         |                                                        |                |         |         |
| 98  | Analyze all dams, their capacity, and failure triggers in or affecting Kansas City, MO to estimate downstream risk to life and property.                   | 2020 | Ongoing | Partnering with USACE to start the project of Dam Breach Risk Assessment  | Education and Awareness Programs      | Medium | Ongoing | Will select 20 dams to study first.                    | Water Services | \$150K  | USACE   |
| 99  | Collaborate with MDNR and US Army Corps methods to develop and determine inundation mapping for dams’ failure to reduce loss of life from flooding.        | 2020 | Ongoing | Partnering with USACE to start the project of Dam Breach Risk Assessment. | Education and Awareness Programs      | Medium | Ongoing | Will select 20 dams to study first.                    | Water Services | \$150K  | USACE   |
| 100 | Identify and estimate the height of all dams within the Kansas City metropolitan area                                                                      | 2015 | Ongoing | Partnering with USACE to start the project of Dam Breach Risk Assessment, | Structure and Infrastructure Projects | Medium | Ongoing | Anticipating to get the data for the selected 20 dams. | Water Services | \$150K  | USACE   |

| 1   | Floods                                                                                                                                                                                                                                                |           |                   |                                                                                                                                    |                                       |          |                    |                                                   |                                                                |                    |                |
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| 2   | Mitigation Goals and Action Steps                                                                                                                                                                                                                     | Plan Year | Status of Project | Status Explanation                                                                                                                 | Type of Mitigation Activity           | Priority | Date of Completion | Cost/Benefit & <u>2025 Annual Review/Update</u>   | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source |
| 101 | Include maps and information from inundation studies and dam emergency action plans in local emergency operations and land use plans                                                                                                                  | 2015      | Completed         | Current released maps are used in LEOP; will continue during the 2025 Hazard Mitigation Plan's cycle (if new information released) | Local Plans and Regulations           | High     | 2018               | Completed work via EM and USACE for major dams.   | Emergency Management                                           |                    |                |
| 102 | Obtain assessed valuation data and population figures for areas in the vicinity of dam inundation pathways so that enhanced vulnerability assessments may be conducted describing the number of lives and amount of property at risk from dam failure | 2015      | Ongoing           | Partnering with USACE to start the project of Dam Breach Risk Assessment, targeting 20 dams.                                       | Local Plans and Regulations           | Medium   | Ongoing            | Data is being compiled                            | Water Services                                                 | \$150K             | USACE          |
| 103 | Prioritize by GIS the size and volume of the dams within the Kansas City metropolitan area under normal and full volume conditions                                                                                                                    | 2015      | Deferred          | Additional components and resources needed to obtain the data; will continue during the 2020 cycle                                 | Structure and Infrastructure Projects | Medium   | Deferred           | On hold until data and models above are completed | Water Services                                                 |                    |                |

|     |                                                                                                                                                                                                                                                   |      |           |                                                                                                                                                                                                            |                                       |      |         |                                                        |                      |         |         |
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| 104 | Using the latest information from many resources, develop GIS layers and maps indicating the locations, inundation pathways, and hazard potential of known dams within the Kansas City metropolitan area.                                         | 2020 | Ongoing   | Partnering with USACE to start the project of Dam Breach Risk Assessment, targeting 20 dams.                                                                                                               | Local Plans and Regulations           | High | Ongoing | Just starting the project                              | Water Services       | \$150K  | USACE   |
| 105 | Using the latest information from the NID, MDNR's inventory of dams, and other resources, develop GIS layers and maps indicating the locations, inundation pathways, and hazard potential of known dams within the Kansas City metropolitan area. | 2015 | Completed | 2017 - GIS was developed; this will be revisited during the 2025 Hazard Mitigation Plan's Goals and Actions                                                                                                | Local Plans and Regulations           | High | 2017    | Done in the past. Will be revisited in the 2025 cycle. | Emergency Management |         |         |
| 106 | Work with MDNR's Water Resources program and USACE to determine which dams in the Kansas City regional area have had inundation studies, inundation pathway maps, and emergency action plans developed                                            | 2015 | Ongoing   | Partnering with USACE to start the project of Dam Breach Risk Assessment, targeting 20 dams.                                                                                                               | Structure and Infrastructure Projects | High | Ongoing | This task will be part of the project.                 | Water Services       |         |         |
| 107 | Improve KCMO's ability to mitigate damage from hazardous materials released due to flooding                                                                                                                                                       |      |           |                                                                                                                                                                                                            |                                       |      |         |                                                        |                      |         |         |
| 108 | Ensure personnel have proper training (SDS, Hazcom, HAZWOPER, etc.) to respond and mitigate the damage from hazardous material release due to flooding.                                                                                           | 2020 | Ongoing   | Training is an ongoing process as permitted by appropriate funding, but is conducted to meet and exceed all components of the current NFPA 470-2022, OSHA 1910.120, and EPA 311 standards and regulations. | Education and Awareness Programs      | High | Ongoing | Ongoing                                                | Fire Dept            | Unknown | Unknown |

| 1   | Floods                                                                                                                                                  |           |                   |                                                                                                                |                                  |          |                    |                                             |                                                                |                    |                |
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| 2   | Mitigation Goals and Action Steps                                                                                                                       | Plan Year | Status of Project | Status Explanation                                                                                             | Type of Mitigation Activity      | Priority | Date of Completion | Cost/Benefit &<br>2024 Annual Review/Update | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source |
| 107 | Improve KCMO's ability to mitigate damage from hazardous materials released due to flooding                                                             |           |                   |                                                                                                                |                                  |          |                    |                                             |                                                                |                    |                |
| 108 | Ensure personnel have proper training (SDS, Hazcom, HAZWOPER, etc.) to respond and mitigate the damage from hazardous material release due to flooding. | 2020      | Ongoing           | This training is provided on a regular basis, but funding sources to provide the training is being researched. | Education and Awareness Programs | High     | Ongoing            | Ongoing                                     | Fire Dept                                                      | Unknown            | Unknown        |

| 1 | Floods |  |  |  |  |  |  |  |  |  |  |
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|     | Mitigation Goals and Action Steps                                                                                                                               | Plan Year | Status of Project | Status Explanation                                                                                                                                                                                                                                        | Type of Mitigation Activity           | Priority | Date of Completion | Cost/Benefit & <u>2024 Annual Review/Update</u> | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source |
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| 2   |                                                                                                                                                                 |           |                   |                                                                                                                                                                                                                                                           |                                       |          |                    |                                                 |                                                                |                    |                |
| 109 | Increase resiliency of storage mechanism for hazardous materials against a release due to flooding damage                                                       | 2020      | Ongoing           | Storage of hazardous materials is a continuous event and performed per the UBC/UFC as well as state and federal guidelines as funding allows. More a function for codes administration, but Fire does work with codes inspection as warranted and needed. | Structure and Infrastructure Projects | High     | Not Determined     | Requires update to City code and regulations    | Fire Dept                                                      | Unknown            | Unknown        |
| 110 | Provide KCFD personnel training best on the latest lessons learned and best practices in containing hazardous materials released due to flooding.               | 2020      | Ongoing           | Hazmat release and containment training is an ongoing process.                                                                                                                                                                                            | Structure and Infrastructure Projects | High     | Ongoing            | unknown                                         | Fire Dept                                                      | Unknown            | Unknown        |
| 111 | Provide KCFD personnel training on methods to secure hazardous materials against release due to flooding.                                                       | 2020      | Ongoing           | Hazmat release best practices training is ongoing.                                                                                                                                                                                                        | Education and Awareness Programs      | High     | Ongoing            | Ongoing                                         | Fire Dept                                                      | Unknown            | Unknown        |
| 112 | Research and implement equipment and procedures for KCFD to efficiently contain hazardous material incidents resulting from flooding.                           | 2020      | Ongoing           | Hazmat release and containment equipment and training is ongoing.                                                                                                                                                                                         | Structure and Infrastructure Projects | High     | Ongoing            | unknown                                         | Fire Dept                                                      | Unknown            | Unknown        |
| 113 | Research training and funding for training for methods and best practices to respond and mitigate the damage from hazardous materials released due to flooding. | 2020      | Ongoing           | Hazmat release and containment training is ongoing.                                                                                                                                                                                                       | Education and Awareness Programs      | High     | Ongoing            | unknown                                         | Fire Dept                                                      | Unknown            | Unknown        |
| 114 | Research training and funding for training for methods and best practices to secure hazardous materials from release due to flooding.                           | 2020      | Ongoing           | Hazmat release and containment training is ongoing.                                                                                                                                                                                                       | Education and Awareness Programs      | High     | Ongoing            | unknown                                         | Fire Dept                                                      | Unknown            | Unknown        |
| 115 | Improve reliability and capability of telecommunications network to resist the effects of flooding                                                              |           |                   |                                                                                                                                                                                                                                                           |                                       |          |                    |                                                 |                                                                |                    |                |
| 116 | Add redundancy and multiple pathways for fiber network to ensure continued operation during flooding                                                            | 2020      | Ongoing           | With the upgrade of the City's Flood Warning System, KCMO is planning to improve its data services by using dual cloud-based services.                                                                                                                    | Structure and Infrastructure Projects | High     | Ongoing            | Ongoing as system upgrades are made             | <b>Police Dept,</b><br><i>Emergency Management</i>             | Unknown            | Unknown        |

|     |                                                                                                                                                          |                  |                          |                                                                                                                             |                                       |                 |                           |                                                            |                                                                           |                           |                       |
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| 1   | <b>Floods</b>                                                                                                                                            |                  |                          |                                                                                                                             |                                       |                 |                           |                                                            |                                                                           |                           |                       |
| 2   | <b>Mitigation Goals and Action Steps</b>                                                                                                                 | <b>Plan Year</b> | <b>Status of Project</b> | <b>Status Explanation</b>                                                                                                   | <b>Type of Mitigation Activity</b>    | <b>Priority</b> | <b>Date of Completion</b> | <b>Cost/Benefit &amp; <u>2025 Annual Review/Update</u></b> | <b>Primary Agency Responsible for Implementation &amp; Administration</b> | <b>Cost Estimate (\$)</b> | <b>Funding Source</b> |
| 117 | <b>Improve the capabilities of water rescue teams</b>                                                                                                    |                  |                          |                                                                                                                             |                                       |                 |                           |                                                            |                                                                           |                           |                       |
| 118 | Identify and conduct training courses and exercises for water rescues in flood waters                                                                    | 2015             | Ongoing                  | Training for personnel is continual and refreshed constantly.                                                               | Education and Awareness Programs      | High            | Ongoing                   | unknown                                                    | Fire Dept                                                                 | Unknown                   | Unknown               |
| 119 | Identify funding sources to enhance the operational capabilities of water rescue teams in conducting rescues in flood waters                             | 2015             | Ongoing                  | Capability improvement diminished due to the defunding of USAR teams. FD will continue to pursue possible funding sources.  | Structure and Infrastructure Projects | High            | Ongoing                   | unknown                                                    | Fire Dept                                                                 | Unknown                   | Unknown               |
| 120 | Improve the capabilities of water rescue teams through providing equipment and other means to conduct flood water rescues                                | 2015             | Ongoing                  | Capability improvement diminished due to the defunding of USAR teams. FD will continue to pursue possible funding sources.  | Structure and Infrastructure Projects | High            | Ongoing                   | unknown                                                    | Fire Dept                                                                 | Unknown                   | Unknown               |
| 121 | <b>Improve the capability of the Aviation Department to mitigate the damage from flooding</b>                                                            |                  |                          |                                                                                                                             |                                       |                 |                           |                                                            |                                                                           |                           |                       |
| 122 | As funding becomes available, research elements for development of a Stormwater Master Plan at the MKC.                                                  | 2020             | Ongoing                  | This action is dependent upon funding; no anticipated completion date currently.                                            | Structure and Infrastructure Projects | High            | Not Determined            | unknown                                                    | Aviation                                                                  | 1,136,363                 | Federal               |
| 123 | As needed, improve relief well systems at MKC to counter damage from flooding.                                                                           | 2020             | Ongoing                  | Wells are improved/repared as funding and resources become available.                                                       | Structure and Infrastructure Projects | High            | Not Determined            | Ongoing                                                    | Aviation                                                                  | 1,556,880                 | Federal               |
| 124 | Continue to research barricade techniques and products to protect against flooding at the Downtown Airport and purchase and/or implement as appropriate. | 2020             | Ongoing                  | This action is ongoing as funds and resources become available.                                                             | Structure and Infrastructure Projects | High            | Not Determined            | unknown                                                    | Aviation                                                                  | See above                 | Federal               |
| 125 | Enhance and upgrade equipment and protocols to respond to and mitigate the damage from flooding                                                          | 2015             | Ongoing                  | 2019 purchased new sand barrier equipment; added new wells. Will carry this action over to 2020 plan.                       | Structure and Infrastructure Projects | High            | Ongoing                   | unknown                                                    | Aviation                                                                  | Unknown                   | Unknown               |
| 126 | Identify alternate staging and evacuation areas for personnel and equipment in the event of flooding                                                     | 2015             | Completed                | Additional areas were located. Due to changing ownership and other factors, we will continue to pursue new areas as needed. | Structure and Infrastructure Projects | High            | 2019                      | unknown                                                    | Aviation                                                                  | Unknown                   | Unknown               |

|     |                                                                                                                                                                                 |                  |                          |                                                                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                          |                                                                           |                           |                       |
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| 1   | <b>Floods</b>                                                                                                                                                                   |                  |                          |                                                                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                          |                                                                           |                           |                       |
| 2   | <b>Mitigation Goals and Action Steps</b>                                                                                                                                        | <b>Plan Year</b> | <b>Status of Project</b> | <b>Status Explanation</b>                                                                                                                                                                                                                                                                     | <b>Type of Mitigation Activity</b>    | <b>Priority</b> | <b>Date of Completion</b> | <b>Cost/Benefit &amp; <u>2025 Annual Review/Update</u></b>                                                               | <b>Primary Agency Responsible for Implementation &amp; Administration</b> | <b>Cost Estimate (\$)</b> | <b>Funding Source</b> |
| 127 | <b>Improve the capability of the Aviation Department to mitigate the damage from flooding due to levee failure</b>                                                              |                  |                          |                                                                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                          |                                                                           |                           |                       |
| 128 | Enhance and upgrade equipment and protocols to respond to and mitigate the damage from flooding from levee failure                                                              | 2015             | Ongoing                  | Wheeler Airport will continue to enhance and improve its capabilities as technology and resources allow.                                                                                                                                                                                      | Structure and Infrastructure Projects | High            | Ongoing                   | Ongoing                                                                                                                  | Aviation                                                                  |                           |                       |
| 129 | Identify alternate staging and evacuation areas for personnel and equipment in the event of flooding from levee failure.                                                        | 2015             | Completed                | Additional areas were located. Due to changing ownership and other factors, we will continue to pursue new areas as needed.                                                                                                                                                                   | Local Plans and Regulations           | Medium          | 2018                      | Completed                                                                                                                | Aviation                                                                  |                           |                       |
|     |                                                                                                                                                                                 |                  |                          |                                                                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                          |                                                                           |                           |                       |
| 130 | <b>Improve the structural integrity of dams to reduce the threat of dam failures, which cause flooding</b>                                                                      |                  |                          |                                                                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                          |                                                                           |                           |                       |
| 131 | Develop and implement codes and ordinances requiring minimum site and construction standards for dams                                                                           | 2015             | Deferred                 | funding for research not available; will carry over to the next round of the plan                                                                                                                                                                                                             | Local Plans and Regulations           | Low             | Deferred                  | Covered by the state of Missouri Dam and Reservoir Safety Program                                                        | Water Services                                                            |                           |                       |
| 132 | Encourage dam owners to repair or upgrade their dams, particularly those that are more 50 years old, by offering them a reduction in local taxes or similar financial incentive | 2015             |                          | Through the inspection program of Stormwater Best-management Practices, the City enforce the dam owners to repair their dams where and when needed at their own cost, regardless the age of the structures.                                                                                   | Structure and Infrastructure Projects | Medium          | Ongoing                   | The City reaches out to the owners of the dams requesting repairs where needed.                                          | Water Services                                                            |                           |                       |
| 133 | Identify and pursue grants to repair or improve dams                                                                                                                            | 2015             | Ongoing                  | Partnering with USACE for the Dam Breach Risk Assessment project.                                                                                                                                                                                                                             | Structure and Infrastructure Projects | Low             | Ongoing                   | Select 20 dams to start                                                                                                  | Water Services                                                            | \$150K                    | USACE                 |
| 134 | Mandate for regular repairs and improvements to dams within the Kansas City metropolitan area owned by the city and privately                                                   | 2015             | Ongoing                  | Water Dept. inspects stormwater detention/retention basins. If any issue is identified with an associated dam, the issue will be pursued for correction.                                                                                                                                      | Structure and Infrastructure Projects | High            | Ongoing                   | Ongoing, via MS4 group which is supported by Neighborhoods which holds the authority to require these items per Chapter. | <b><u>Neighborhoods</u></b> Water Services                                |                           |                       |
| 135 | <b>Improve warning and evacuation systems and procedures in the event of flooding due to dam failure</b>                                                                        |                  |                          |                                                                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                          |                                                                           |                           |                       |
| 136 | Adopt policies, codes, or ordinances to discourage development in the vicinity of dam inundation zones                                                                          | 2015             | Deferred                 | Working with USACE to get the inundation maps. However, adopting policies will take time and resources.                                                                                                                                                                                       | Local Plans and Regulations           | Medium          | Ongoing                   | Deferred                                                                                                                 | Water Services                                                            |                           |                       |
| 137 | Where feasible, add and maintain outdoor warning systems to campgrounds and other recreational areas downstream from dams                                                       | 2015             | Deferred                 | no funding available; will carry over to the next round of plan with broader, more accurate action                                                                                                                                                                                            | Structure and Infrastructure Projects | Medium          | Deferred                  | Deferred                                                                                                                 | Water Services                                                            |                           |                       |
| 138 | <b>Incorporate strategies into KCMO development plans to mitigate damage from flooding</b>                                                                                      |                  |                          |                                                                                                                                                                                                                                                                                               |                                       |                 |                           |                                                                                                                          |                                                                           |                           |                       |
| 139 | Incorporate mitigation strategies into the development of KCMO's Comprehensive Plan                                                                                             | 2020             | Ongoing                  | Area plans guides development away from potential hazards including floodplains.<br><br>Partnering with local communities and Kansas City Metro Chapter of American Public Works Association (APWA) to update the Regional APWA Section 5600 Storm Drainage Systems and Facilities for better | Local Plans and Regulations           | Medium          | Ongoing                   | Drafted the updated regional APWA 5600 standards, which also include stormwater BMPs for better management.              | Planning Dept                                                             | >\$200K                   | Water                 |

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|  |  |  |  | management of stormwater |  |  |  |  |  |  |  |
|--|--|--|--|--------------------------|--|--|--|--|--|--|--|

| 1   | Floods                                                                                                                                                                                                    |           |                   |                                                                                                                                                        |                                  |          |                    |                                                                               |                                                                |                    |                                                            |
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| 2   | Mitigation Goals and Action Steps                                                                                                                                                                         | Plan Year | Status of Project | Status Explanation                                                                                                                                     | Type of Mitigation Activity      | Priority | Date of Completion | Cost/Benefit & <u>2025 Annual Review/Update</u>                               | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source                                             |
| 140 | Increase public awareness of health and disease related issues associated with flood waters                                                                                                               |           |                   |                                                                                                                                                        |                                  |          |                    |                                                                               |                                                                |                    |                                                            |
| 141 | Collect and disseminate public education materials that address health and disease issues associated with flood waters                                                                                    | 2015      | Ongoing           | Information is provided by the Health Dept. during flooding incidents.                                                                                 | Education and Awareness Programs | Medium   | Ongoing            | Ongoing through messaging systems, public outreach efforts, and publications. | Emergency Management, Health Dept.                             | Unknown            | PHP/ CRI/ Levee Funds/ Core PH Funds/ Water Services/ City |
| 142 | Identify funding resources for mechanisms to disseminate information to the public regarding protection against health and disease issues associated with flood waters                                    | 2015      | Ongoing           | The Health Department is continuously researching funding sources.                                                                                     | Education and Awareness Programs | Low      | Ongoing            | unknown                                                                       | Health Dept.                                                   | Unknown            | PHP/ CRI/ Levee Funds/ Core PH Funds/ Water Services/ City |
| 143 | Utilize various methods of social media to inform and educate the public regarding health and disease issues associated with flood waters                                                                 | 2015      | Ongoing           | Information is provided by the Health Dept. during flooding incidents.                                                                                 | Education and Awareness Programs | Low      | Ongoing            | unknown                                                                       | Health Dept.                                                   | Unknown            | Levee Funds/ Core PH Funds/ Water Services/ City           |
| 144 | Integrate flood mitigation strategies with projects and activities designed to protect, restore, or enhance ecosystems and the environment and/or create recreational opportunities for the community.    |           |                   |                                                                                                                                                        |                                  |          |                    |                                                                               |                                                                |                    |                                                            |
| 145 | Consider alternative uses for floodplains and flood prone areas that have less impact from flooding                                                                                                       | 2015      | Ongoing           | This strategy was adopted in the drafted the Technical Report with Environmental Considerations for the Little Blue River Flood Risk Management Study. | Natural Systems Protection       | Medium   | Ongoing            | Ongoing                                                                       | Planning Dept                                                  | Unknown            | Water                                                      |
| 146 | Consider the construction of detention basins, small lakes, and greenways or riparian corridors in areas of new development to channel and catch storm water, thereby reducing the likelihood of flooding | 2015      | Ongoing           | It will continue to be required and at a higher standard with the newly drafted APWA Section 5600 Storm Drainage Systems and Facilities.               | Natural Systems Protection       | High     | Ongoing            | Ongoing                                                                       | Water Dept.                                                    | Unknown            | Water                                                      |

| 1   | Floods                                                                                                                                                                                                                             |           |                   |                                                                                                                                                                                                                                                                                                                     |                                  |               |                    |                                                                                          |                                                                |                    |                                                   |
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| 2   | Mitigation Goals and Action Steps                                                                                                                                                                                                  | Plan Year | Status of Project | Status Explanation                                                                                                                                                                                                                                                                                                  | Type of Mitigation Activity      | Priority      | Date of Completion | Cost/Benefit & <u>2024 Annual Review/Update</u>                                          | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source                                    |
| 147 | Develop partnerships between emergency management, floodplain management, and environmental groups to provide education regarding the benefits of collaboration                                                                    | 2015      | Ongoing           | This action covers multiple actions and will thus be reflected in the 2025 plan. Much progress has been made.                                                                                                                                                                                                       | Education and Awareness Programs | Medium        | Ongoing            | Continuously expanding and improving connections with various stakeholders.              | Emergency Management, Water Services                           | Unknown            | Unknown                                           |
| 148 | Identify funding sources for the acquisition of flood prone land of environmental, recreational, and flood mitigation uses                                                                                                         | 2015      | Ongoing           | A funding source was identified to cover 20 properties on a flood prone zone. However, none of the properties was eligible and the relevant federal policy has changed to remove that funding program. The buyout effort was terminated.                                                                            | Natural Systems Protection       | High          | Ongoing            | NA                                                                                       | Water Services, Emergency Management                           | Unknown            | NA                                                |
| 149 | Identify specific programs and activities that can be developed and implement with stakeholders                                                                                                                                    | 2015      | Ongoing           | WSD is working with USACE on the City-wide Stream Asset Inventory and working on the Updating the National Wetlands Inventory of the HUC-12 Watersheds within the City. The ultimate goals of the projects are to use the output as the base to update the Stream Buffer Ordinance and to guide future development. | Education and Awareness Programs | Medium        | Ongoing            | Ongoing                                                                                  | Water Services                                                 | \$500K             | Stormwater Fee and federal grant and federal fund |
| 150 | In concert with existing comprehensive and land use plans, develop a strategy for acquiring flood prone property for use as open space or park land                                                                                | 2015      | Ongoing           | Much land has been acquired; means of less costly acquisition have been explored. This will be reviewed in the 2025 round of the plan.                                                                                                                                                                              | Natural Systems Protection       | Medium        | Ongoing            | Ongoing                                                                                  | Planning Dept                                                  | Unknown            | PIAC, other                                       |
| 151 | Research controlling runoff to original native conditions with respect to peak flow and velocity.                                                                                                                                  | 2020      | Ongoing           | KCMO is working with MARC and other local municipalities in the region to update the Regional APWA 5600 and Stormwater BMP manual. The draft was produced and being reviewed.                                                                                                                                       | Not Specified                    | Not Specified | Ongoing            | Ongoing, Update to APWA 5600 Storm water underway by Mid-America Regional Council (MARC) | Metropolitan Planning Organization/ Water Service              | Unknown            | Water                                             |
| 152 | Seek better methods to reduce runoff volume increases caused by development to be more like native conditions through finding a lower flow rate and velocity that can reduce erosive impacts due to larger total volume of runoff. | 2020      | Ongoing           | KCMO is working with MARC and other local municipalities in the region to update the Regional APWA5600 and Stormwater BMP manual. A draft was produced and being reviewed.                                                                                                                                          | Natural Systems Protection       | Medium        | Ongoing            | Ongoing, Update to APWA 5600 Storm water underway by MARC                                | Metropolitan Planning Organization/ Water Service              | Unknown            | Water                                             |
| 153 | Seek storage, infiltration, roughness, and soil amendment methods of slowing, reducing, infiltrating, and storing runoff including reduction of impervious parking.                                                                | 2020      | Ongoing           | KCMO is working with MARC and other local municipalities in the region to update the Regional APWA5600 and Stormwater BMP manual. A draft was produced and being reviewed.                                                                                                                                          | Natural Systems Protection       | Medium        | Ongoing            | Ongoing, Update to APWA 5600 Storm water underway by MARC                                | Metropolitan Planning Organization/ Water Service              | Unknown            | Unknown                                           |
| 154 | Seek to reduce collection by inlets and conveyance by pipes where development or redevelopment creates runoff volumes greater                                                                                                      | 2020      | Ongoing           | KCMO is working with MARC and other local municipalities in the region to update the Regional APWA5600 and Stormwater                                                                                                                                                                                               | Natural Systems Protection       | Medium        | Ongoing            | Ongoing, Update to APWA 5600 Storm water underway by MARC                                | Metropolitan Planning Organization/ Water Service              | Unknown            | Unknown                                           |

|     |                                                                                                                                                                                                       |      |         |                                                                                                                                                                                                                                                                                                       |                            |        |         |                                                                                                                                                                                             |                                                   |         |             |
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|     | than native or existing runoff totals.                                                                                                                                                                |      |         | BMP manual. A draft was produced and being reviewed.                                                                                                                                                                                                                                                  |                            |        |         |                                                                                                                                                                                             |                                                   |         |             |
| 155 | Work with area environmental groups and other stakeholders to develop and implement flood mitigation strategies that also promote the restoration and/or sustainability of fish and wildlife habitats | 2015 | Ongoing | <p>KCMO is working with MARC and other local municipalities in the region to update the Regional APWA5600 and Stormwater BMP manual. A draft was produced and being reviewed.</p> <p>Partnering with seven local communities, MARC and USACE on the Little Blue River Flood Risk Management Study</p> | Natural Systems Protection | Medium | Ongoing | <p>Ongoing, Update to APWA 5600 Storm water underway by MARC</p> <p>The Technical Report with Environmental Considerations for the Little Blue River Flood Risk Management was drafted.</p> | Metropolitan Planning Organization/ Water Service | Unknown | PIAC, other |

|     |                                                                                                                                                                                                                                          |                  |                          |                                                                                                                                                                                                                                                                     |                                       |                 |                           |                                                                                                                                                                           |                                                                           |                           |                       |
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| 1   | <b>Floods</b>                                                                                                                                                                                                                            |                  |                          |                                                                                                                                                                                                                                                                     |                                       |                 |                           |                                                                                                                                                                           |                                                                           |                           |                       |
| 2   | <b>Mitigation Goals and Action Steps</b>                                                                                                                                                                                                 | <b>Plan Year</b> | <b>Status of Project</b> | <b>Status Explanation</b>                                                                                                                                                                                                                                           | <b>Type of Mitigation Activity</b>    | <b>Priority</b> | <b>Date of Completion</b> | <b>Cost/Benefit &amp; <u>2025 Annual Review/Update</u></b>                                                                                                                | <b>Primary Agency Responsible for Implementation &amp; Administration</b> | <b>Cost Estimate (\$)</b> | <b>Funding Source</b> |
| 156 | <b>Mitigate flooding damage to public facilities</b>                                                                                                                                                                                     |                  |                          |                                                                                                                                                                                                                                                                     |                                       |                 |                           |                                                                                                                                                                           |                                                                           |                           |                       |
| 157 | Identify funding sources to implement flood damage mitigation mechanisms such as water pumping equipment                                                                                                                                 | 2015             | Ongoing                  | WSD continually evaluates options when during facility plan reviews and facility improvements                                                                                                                                                                       | Structure and Infrastructure Projects | Medium          | Ongoing                   | Ongoing                                                                                                                                                                   | Water Services                                                            | Ongoing                   | Water fund            |
| 158 | Implement flood damage mitigation mechanisms such as water pumping equipment                                                                                                                                                             | 2015             | Ongoing                  | Water Department continually evaluates and upgrades existing pumping capacity as needed.                                                                                                                                                                            | Structure and Infrastructure Projects | Medium          | Ongoing                   | Ongoing,                                                                                                                                                                  | Water Services                                                            | Ongoing                   | Sewer fund            |
| 159 | Research the feasibility of installing water pumping equipment in public facilities to reduce the damage from minor flooding                                                                                                             | 2015             | Ongoing                  | Water Department continually evaluates and upgrades existing pumping capacity as needed.                                                                                                                                                                            | Structure and Infrastructure Projects | Medium          | Ongoing                   | Ongoing,                                                                                                                                                                  | Water Services                                                            | Ongoing                   | Sewer fund            |
| 160 | <b>Participate in and ensure compliance with flood mitigation and floodplain management programs.</b>                                                                                                                                    |                  |                          |                                                                                                                                                                                                                                                                     |                                       |                 |                           |                                                                                                                                                                           |                                                                           |                           |                       |
| 161 | Obtain the latest copies of the flood insurance rate maps (FIRMs), floodplain maps, and similar documents                                                                                                                                | 2015             | Ongoing                  | KCMO has obtained the most recent maps (2017 and 2023, respectively). Any changes in the floodplain boundary will be realized when generating a new layer of affected structures that are affected by the new floodplain boundary. This process is repeated yearly. | Local Plans and Regulations           | High            | 2024                      | On going                                                                                                                                                                  | Planning Dept., <b><u>Water Services</u></b>                              | Unknown                   | Water Department      |
| 162 | Participate in the National Flood Insurance Program (NFIP) and Community Rating System (CRS)                                                                                                                                             | 2015             | Ongoing                  | KCMO continues to participate in the NFIP and the Community Rating System. This will be carried over to the 2025 plan.                                                                                                                                              | Local Plans and Regulations           | High            | Ongoing                   | On going                                                                                                                                                                  | Planning Dept., <b><u>Water Services</u></b>                              | Unknown                   | Stormwater fee        |
| 163 | **Continue efforts to train staff and specialize to become a Certified Technical Partner with FEMA.                                                                                                                                      | 2020             | Ongoing                  | City continues to improve its staff such as through Certified Technical Partner training.                                                                                                                                                                           | Education and Awareness Programs      | High            | Ongoing                   | Ongoing                                                                                                                                                                   | <b><u>Planning Dept., Water Services</u></b>                              | Unknown                   | City                  |
| 164 | **Coordinate and fund with private partners to obtain the latest copies of the flood insurance rate maps (FIRMs), and other GIS products. Add other supporting information within a Flood Risk component of City's Parcel Viewer Mapper. | 2020             | Ongoing                  | The information is digitally available through the online portal by FEMA's Map Service Center. The City's Parcel Viewer Mapper provides supporting information.                                                                                                     | Education and Awareness Programs      | High            | Ongoing                   | All of this is digitally available for download online through FEMA's Map Service Center. <a href="https://msc.fema.gov/portal/home">https://msc.fema.gov/portal/home</a> | Water Services                                                            | Unknown                   | Unknown               |
| 165 | **Improve Floodplain Administration through providing more tools for the administrators, public, and development that easily, technically inform them of flood risk and requirements.                                                    | 2020             | Ongoing                  | Improvements are constantly being made.                                                                                                                                                                                                                             | Education and Awareness Programs      | High            | Ongoing                   | Ongoing, via Planning Dept. and Water Services                                                                                                                            | Planning Dept., Floodplain Manager, Water Services                        | Unknown                   | Unknown               |

| 2   | Mitigation Goals and Action Steps                                                                                                                                                                                                    | Plan Year | Status of Project | Status Explanation                                                                                                                                                                                                                                                                 | Type of Mitigation Activity           | Priority      | Date of Completion | Cost/Benefit & <u>2025Annual Review/Update</u>                                                                                                                 | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source                     |
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| 166 | **Improve Information Bulletin information relating to Floodplain Regulatory compliance and processes.                                                                                                                               | 2020      | Ongoing           | The Information Bulletin is improved as new requirements are adopted.                                                                                                                                                                                                              | Local Plans and Regulations           | High          | Not Determined     | Ongoing,                                                                                                                                                       | Planning Dept., Floodplain Manager                             | Unknown            | General fund                       |
| 167 | **Participate in the Community Rating System (CRS) and plan its stages of improvement and needs to seek support and funding.                                                                                                         | 2020      | Ongoing           | This is an ongoing action as circumstances and requirements change.                                                                                                                                                                                                                | Local Plans and Regulations           | High          | Ongoing            | KCMO has been in the CRS program since 2009                                                                                                                    | <u>Water Services</u> , Planning Dept., Floodplain Manager     | Unknown            | Stormwater fee, Safety Tax revenue |
| 168 | **Participate in the National Flood Insurance Program (NFIP)                                                                                                                                                                         | 2020      | Ongoing           | This is an action performed on an annual basis.                                                                                                                                                                                                                                    | Local Plans and Regulations           | High          | Ongoing            | Ongoing                                                                                                                                                        | Planning Dept., floodplain manager, Water Services             | Unknown            | Stormwater fee, Safety Tax revenue |
| 169 | <b>Reduce flood related damage to public and private property in flood prone areas through structural and nonstructural retrofits, prevention of development within, or removal of property</b>                                      |           |                   |                                                                                                                                                                                                                                                                                    |                                       |               |                    |                                                                                                                                                                |                                                                |                    |                                    |
| 170 | **Adopt ordinances prohibiting private development in flood plains or flood- prone areas.                                                                                                                                            | 2020      | Ongoing           | The existing Development Codes including the Stream Buffer Regulation provide restrictions on private development. The Regional APWA 5600 Stormwater Standard was updated in Dec. 2025. The updated version has a higher standard. KCMO is preparing to adopt the updated version. | Local Plans and Regulations           | High          | Ongoing            | Ongoing, The updated Regional APWA 5600 standard requires preservation & restoration, which sets a higher standard.                                            | <u>Planning Dept.</u> , <u>Water Services</u>                  | Unknown            | Unknown                            |
| 171 | **As funding allows, repetitive flood loss properties or structures will, in flood prone areas, be targeted for buyout or other mitigations that meet FEMA and local Minimums of protection for base flood elevations and freeboard. | 2020      | On Hold           | Buyouts occur as funding becomes available and varies by property. Currently, an effort to buy out 20 RLP structures along the Town Fork Creek was cancelled due to both a change in a relevant federal practice and ineligibility of the properties.                              | Not Specified                         | Not Specified | On Hold            | No relevant activities.                                                                                                                                        | <u>Water Services</u> , Floodplain Manager                     | unknown            | Unknown                            |
| 172 | Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to flooding and, if necessary, retrofit or modify them to decrease vulnerability.                                               | 2020      | Ongoing           | Completion date is based on external agency timelines.                                                                                                                                                                                                                             | Structure and Infrastructure Projects | Medium        | Ongoing            | Managed through the permit processes of the City.                                                                                                              | Water Services, Emergency Management                           | Unknown            | Unknown                            |
| 173 | For public facilities, seek to modernize to FEMA regulatory compliance, even when not required, if cost benefit justifies.                                                                                                           | 2020      | Ongoing           | This is implemented by operators for the Water Supply Plant, all City Wastewater Treatment Plants and Pump Stations.                                                                                                                                                               | Not Specified                         | Not Specified | Ongoing            | Related efforts continue within Water Services daily. Two or more major facilities are in design for these and working to meet current modernized regulations. | Water Services                                                 | Unknown            | Unknown                            |

| 1   | Floods                                                                                                                                                                                 |           |                   |                                                                                                                                                                      |                                       |               |                    |                                                                                                      |                                                                |                    |                |
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| 2   | Mitigation Goals and Action Steps                                                                                                                                                      | Plan Year | Status of Project | Status Explanation                                                                                                                                                   | Type of Mitigation Activity           | Priority      | Date of Completion | Cost/Benefit & <u>2024 Annual Review/Update</u>                                                      | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source |
| 174 | Identify funding sources to implement flood damage mitigation mechanisms.                                                                                                              | 2020      | Ongoing           | This action is to be accomplished as time and resources allow.                                                                                                       | Structure and Infrastructure Projects | High          | Ongoing            | Ongoing, Grants, PIAC, Go-Bonds, USACE                                                               | Water Services                                                 | Unknown            | Unknown        |
| 175 | Levy fees on non-public use development in floodplains or flood-prone areas to finance flood mitigation, preparedness, response, and recovery actions.                                 | 2020      | Deferred          | This action may be considered when support is generated.                                                                                                             | Local Plans and Regulations           | High          | TBD                | Need Legal Determination based on Missouri Law                                                       | Planning Dept                                                  | Unknown            | Unknown        |
| 176 | Provide funding for water and wastewater districts to elevate vulnerable equipment, or implement other modifications, at water and wastewater facilities to FEMA and other standards.  | 2020      | Ongoing           | This is implemented by operators for the Water Supply Plant, all City Wastewater Treatment Plants and Pump Stations.                                                 | Not Specified                         | Not Specified | Ongoing            | Ongoing                                                                                              | Water Services                                                 | Unknown            | Unknown        |
| 177 | Reduce/mitigate the risk of flooding on public facilities in flood-prone areas.                                                                                                        | 2020      | Ongoing           | This is implemented by operators for the Water Supply Plant, all City Wastewater Treatment Plants and Pump Stations.                                                 | Structure and Infrastructure Projects | High          | Ongoing            | Ongoing                                                                                              | Water Services                                                 | Unknown            | Unknown        |
| 178 | Require development identify its frequency and severity of risk and base flood elevations per NFIP and City adopted APWA standards and require appropriate local community freeboard.  | 2020      | Ongoing           | The updated Regional APWA 5600 Standards requires 2 ft free-board. KCMO is planning to adopt the regional version.                                                   | Local Plans and Regulations           | High          | Ongoing            | Review, Inspection and Enforcement all need to use the same standard to ensure the benefit.          | <u>Planning Dept.,</u><br><u>Water Services</u>                | Unknown            | Water          |
| 179 | Research and implement methods to continually improve Chapters and standards to better identify flood risks to better inform and prevent harm to or from development or redevelopment. | 2020      | Ongoing           | One of the leading sponsors for the regional effort to update the APWA 5600 and BMP manual.                                                                          | Not Specified                         | Not Specified | Ongoing            | Ongoing, The Regional APWA 5600 Stormwater standard was updated.                                     | <u>Planning Dept.,</u><br><u>Water Services</u>                | >\$200 K           | Water          |
| 180 | **Use methods to encourage homeowners and businesses to reduce/mitigate the risk of flooding for their structures.                                                                     | 2020      | Ongoing           | This was done through distributing information through the Department’s website, local public libraries and realtors, and through bill inserts. to 140,000 customers | Not Specified                         | Not Specified | Ongoing            | Online support and contacts. Utility Inserts also provide information, contacts, and links for help. | <u>Water Services,</u><br><u>Planning Dept.</u>                | Unknown            | Unknown        |

| 1   | Floods                                                                                                                                                                  |           |                   |                    |                             |          |                    |                                                 |                                                                |                    |                |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|--------------------|-----------------------------|----------|--------------------|-------------------------------------------------|----------------------------------------------------------------|--------------------|----------------|
| 2   | Mitigation Goals and Action Steps                                                                                                                                       | Plan Year | Status of Project | Status Explanation | Type of Mitigation Activity | Priority | Date of Completion | Cost/Benefit & <u>2024 Annual Review/Update</u> | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source |
| 181 | Reduce flood-related damage to public, residential, and commercial property in flood-prone areas through structural and nonstructural retrofits or removal of property. |           |                   |                    |                             |          |                    |                                                 |                                                                |                    |                |

|     |                                                                                                                                                                                        |      |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       |      |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                              |         |                             |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------|-----------------------------|
| 182 | As funding allows, repetitive flood loss properties and structures will be targeted for buyout.                                                                                        | 2015 | Ongoing | <p>Studies have shown that, due to population density, buyout may not always be the most efficacious means in all cases. This is a Benefit to Cost Analysis Ratio determination, where Benefits = the damages and costs = the proposed mitigation/solution.</p> <p>1.0 = potential for Federal Grants. Buyout, elevation, dry floodproofing (commercial, industrial) and wet floodproofing options may have better Benefit to Cost analysis ratios.</p> <p>Also see Row 171 for the status.</p> | Structure and Infrastructure Projects | Low  | Ongoing       | <p>Reduces the cost of repetitive damages through structural and nonstructural retrofits and removal of structures on flood- prone property. Historic Development in KCMO often has extremely high Benefits (Damages) vs. Costs (mitigation proposed).</p> <p>BCAs of 9.x or greater to 1 exist in KCMO. FAST is crucial to analysis of this. analysis requires 10-yr to 500-yr flood depth data for structures. KCMO has developed this, but needs FEMA FAST completed to do mass depth to damage curve analysis.</p> | <b><u>Water Services, Planning Dept.</u></b> | Unknown | PIAC, Water Services, Other |
| 183 | **Elevate public facilities in flood prone areas and encourage private sector facilities to do likewise.                                                                               | 2015 | Ongoing | KCMO continues to locate and elevate public but critical facilities as funding is available. KCMO realizes that flood depth data for roads may be more accurate than flood depth data for structures.                                                                                                                                                                                                                                                                                           | Structure and Infrastructure Projects | High | Ongoing       | Reduce flood- related damage to property by elevating structures above floodplains. See Benefit Cost Analysis work and flood depth, frequency work by Water Services                                                                                                                                                                                                                                                                                                                                                   | Water Services                               | Unknown | All departments             |
| 184 | Encourage homeowners and businesses in flood-prone areas to elevate mechanical systems (i.e., furnaces, hot water heaters, electrical panels, etc.).                                   | 2015 | Ongoing | This is done through our public outreach activities.                                                                                                                                                                                                                                                                                                                                                                                                                                            | Education and Awareness Programs      | High | 2017, Ongoing | Sent FEMA’s guidance book to local libraries, and providing the links on the department’s website.                                                                                                                                                                                                                                                                                                                                                                                                                     | Water Services                               | Unknown | Unknown                     |
| 185 | Encourage utility providers to assess their facilities, distribution systems, etc. for vulnerability to flooding and, if necessary, retrofit or modify them to decrease vulnerability. | 2015 | Ongoing | FEMA has taken on the responsibility                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Structure and Infrastructure Projects | High | Ongoing       | Analysis is internal. No means to provide to other utilities not on City GIS.                                                                                                                                                                                                                                                                                                                                                                                                                                          | Water Services                               | Unknown | Unknown                     |

| 1   | Floods                                                                                                                                                                                                   |           |                   |                                                                                         |                                       |          |                    |                                                 |                                                                |                    |                |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|-----------------------------------------------------------------------------------------|---------------------------------------|----------|--------------------|-------------------------------------------------|----------------------------------------------------------------|--------------------|----------------|
| 2   | Mitigation Goals and Action Steps                                                                                                                                                                        | Plan Year | Status of Project | Status Explanation                                                                      | Type of Mitigation Activity           | Priority | Date of Completion | Cost/Benefit & <u>2024 Annual Review/Update</u> | Primary Agency Responsible for Implementation & Administration | Cost Estimate (\$) | Funding Source |
| 186 | **Encourage water and wastewater districts to elevate vulnerable equipment, electrical controls and other equipment at wastewater treatment plants, potable water treatment plants and pumping stations. | 2015      | Ongoing           | Retrofitting falls under WSD; CPD ensures new construction complies with building codes | Structure and Infrastructure Projects | High     | Ongoing            | Ongoing,                                        | Planning Dept., Water Services                                 | Unknown            | Unknown        |

|     |                                                                                                                                                                                                                                    |      |          |                                                                                                                                                                                                                                                                            |                                       |        |          |                                                                                                                            |                                              |         |                     |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------|----------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------|---------------------|
| 187 | **Identify incentives to offer homeowners and businesses to remove or retrofit their structures in flood-prone areas.                                                                                                              | 2010 | Ongoing  | This action is to be accomplished as time and resources allow.                                                                                                                                                                                                             | Not Specified                         | High   | Ongoing  | Grants are restrictive. FEMA require flood insurance policies on structures to be eligible. BRIC does not.                 | <b>Water Services,</b><br>City Planning      | Unknown | Water Service Dept. |
| 188 | <b>Reduce the potential for flooding due to dam failures by enhancing inspection efforts</b>                                                                                                                                       |      |          |                                                                                                                                                                                                                                                                            |                                       |        |          |                                                                                                                            |                                              |         |                     |
| 189 | Adopt codes or ordinances requiring permits, engineering studies, and safety certifications prior to the construction of new dams                                                                                                  | 2015 | Ongoing  | All earthen structures must comply with earthen building codes. The updated Regional APWA 5600 Stormwater Standard has specific requirement. KCMO will adopt the updated Regional Standard.                                                                                | Local Plans and Regulations           | Medium | Ongoing  | Ongoing,                                                                                                                   | Planning Dept.                               |         |                     |
| 190 | Adopt local ordinances and/or state laws requiring all dam owners to develop emergency action plans for their dams and provide local public safety agencies with copies of these plans                                             | 2015 | Deferred | lack funding; will be considered in the 2025 Plan                                                                                                                                                                                                                          | Local Plans and Regulations           | Low    | Deferred | Such a requirement will support public safety.                                                                             | Water Services                               |         |                     |
| 191 | For dams not regulated by the state, encourage dam owners to inspect their dams at least annually and submit the results to MDNR                                                                                                   | 2015 | Ongoing  | Through the City's MS4 programs, the City has been inspecting stormwater detention/retention facilities. Dams are a key component for inspection.                                                                                                                          | Education and Awareness Programs      | Low    | Ongoing  | When staffing resource is available, the existing program can be accelerated to cover more dams within the next few years. | Water Services                               |         | Stormwater fee      |
| 192 | Use storm water storage facilities covenants, to compile GIS locations and inspect on repeating schedule as funding allows. Where O&M is needed, use the covenants and KCMO chapters to preserve function and maintain dam safety. | 2020 | Ongoing  | Mapping the storage facilities is a continuing effort as more facilities are being constructed. Regular inspections are conducted and enforcement action is taken where necessary. Any needs for O&M are shared with the responsible parties timely and pursued as needed. | Structure and Infrastructure Projects | High   | Ongoing  | Update as new facilities are added.                                                                                        | Neighborhoods, City Planning, Water Services | Unknown | Stormwater fee      |
| 193 | <b>To decrease the threat of flooding, reduce the potential for dam failures by adding to the number of dams regulated by the state.</b>                                                                                           |      |          |                                                                                                                                                                                                                                                                            |                                       |        |          |                                                                                                                            |                                              |         |                     |
| 194 | Contact representatives in the state legislature to propose changes in state law lowering the height limit for regulated dams to 25 feet on those holding back 50 acre-feet or more of water.                                      | 2020 | Deferred | Not done.                                                                                                                                                                                                                                                                  | Local Plans and Regulations           | Medium | Deferred | This action requires cooperation of state legislature and is difficult to determine a schedule.                            | City Council                                 | Unknown | Unknown             |
| 195 | Revise existing dam safety laws and/or regulations to add all high hazard dams to the list of regulated dams, regardless of dam height and reservoir storage capacity, until the hazard potential of these dams can be downgraded. | 2020 | New      | Not done.                                                                                                                                                                                                                                                                  | Local Plans and Regulations           | Medium | Deferred | This is an extensive project with multiple external agencies, and a completion date cannot be determined at this time.     | Water Services and or City Council           | Unknown | Unknown             |

## Why Actions Have Not Been Completed

Of the 160 action items, seven have been completed, 142 items are annually recurring and thus ongoing, while 11 have been deferred due to staffing, funding, or the feasibility. The CRS program does not require the completion of these actions by a deadline since external funding is not provided to the City to complete these items. Therefore, the CRS program only requires work towards the completion of these items that have been developed between departments.

Annually recurring actions are considered continuing and thus never completed. Ninety-three percent of the Floodplain Management Plan is ongoing or complete, while seven percent is deferred. Some actions are notably more critical and dependent in series. Some actions rely on and require other tasks in series to be completed or improved.

The need to identify all flood, erosion and meander risks is critical to many other goals and needs. The ability to achieve many critical community development, stormwater-related health and safety actions essential to public health and safety steps depends on having geospatial datasets in order to fully develop a plan to mitigate damages for every structure, parking lot and roadway from flooding frequencies of 10 percent, 4 percent, 2 percent, 1 percent, and 0.2 percent events; or more frequent one- to two-year event conditions that identify erosion, meander, and other stream-shaping risks. Having this data is a step-by-step development process that can drastically improve capital projects and get more solutions for less cost. Analyzed and complete data can better identify risks and help identify the best capital improvement projects to solve the most problems for the least costs among multiple community needs.

The Stormwater fee cannot be used for any form of capital improvement. Only PIAC, state, federal, or other City funding sources, can fund improvements. The Stormwater fee survives on leverage dollars from many other sources as shown in the table Stormwater Funding Sources for Fiscal Year 2025- 2026.

Table 1. Stormwater Funding Sources for Fiscal Year 2025-2026

| Program Element     | Federal Funding | Municipal Stormwater Fee | Municipal General Obligation Bonds | Municipal Sales Tax for Capital Improvements (PIAC) | Municipal Public Safety Tax | Street Maintenance Fund | Water Quality Education |
|---------------------|-----------------|--------------------------|------------------------------------|-----------------------------------------------------|-----------------------------|-------------------------|-------------------------|
| Watershed Studies   | X               | X                        |                                    | X                                                   |                             |                         |                         |
| Project Studies     | X               | X                        | X                                  | X                                                   |                             |                         |                         |
| Capital             | X               |                          | X                                  | X                                                   |                             |                         |                         |
| Maintenance         |                 | X                        |                                    | X                                                   |                             | X                       |                         |
| Flood Response      |                 | X                        |                                    |                                                     | X                           |                         |                         |
| Risk Education      |                 |                          |                                    |                                                     |                             |                         |                         |
| Regulatory Support  |                 | X                        |                                    |                                                     |                             |                         | X                       |
| Municipal Staff     |                 | X                        |                                    |                                                     |                             |                         |                         |
| FY26 Funding Levels | >\$0.04M        | \$8.9M                   | \$0.7M                             | \$5.8M                                              | \$0.7M                      | \$1.1M                  | \$0.3M                  |

## Recommendations

1. Continue to identify additional funding sources, including, but not limited to seeking voter approval for an increase in the Stormwater fee on water bills. *The average stormwater fee per residence per month is \$2.50, generating \$13.9 million per year in revenue, below what is needed to maintain more than 690 miles of Kanass City storm sewers. Future progress requires a Stormwater fee increase, which must be approved by voters. The Stormwater fee that appears on water bills was introduced in 1992 and increased in 1999, 2000 and 2003.*
2. Continue to partner with neighboring communities and other agencies to use the regional or watershed based approach to address flood risk mitigation needs.
3. Continue to support studies, inventory, and assessment of natural resources, e.g., streams, wetlands, and riparian forests, and incorporate these environmental factors into the flood risk management.
4. Expand identification of flood risk fully throughout Kansas City, including both rural and urban portions of the City. *All flood-risk-based issues use a benefit-to-cost ratio methodology to determine if a mitigation or Prevention project and/or program is cost effective and fundable using Federal dollars. Kansas City should focus on the greatest benefit to cost items that can best support the largest number of activities and goals to competitively win Federal grant dollars.*
5. Develop a comprehensive flood risk prevention plan designed to promote proper, planned development and discourage improper, poorly planned development to minimize future flood risk to Kansas City homes, businesses, and public assets, including roads, bridges, parks, and public spaces.
6. City staff should continue their implementation and improvement of this floodplain management plan on an annual basis per CRS requirements. The effort should focus on identification, allowing damage assessments to create excellent benefit-to-cost ratio comparisons for projects and potential capital improvements that can then seek federal dollars for leverage of 50 to 90 percent.
7. Use the best available technology to analyze accurately all flood risks and damage to foster development of the best capital improvements for the least cost and the most community benefit.
8. The Smart Sewer group and many other City departments and offices would benefit from existing training within multiple disciplines of engineering, planning, geosciences, emergency management and floodplain management from training organizations such as the Emergency Management Institute.
9. Modern modeling, computational and geospatial analysis techniques along with GPU-accelerated and machine-learning tools within currently used Storm and Combined Sewer Modeling suites can drastically reduce regulatory workflows by focusing on already identified development, planning, and design needs and solutions due to better identified flood risk. Staffing is needed for PIAC, levees, flood response, maintenance, improvements, prevention, mitigation, Municipal Separate Storm Sewer System (MS4), grants, and other programs, review and regulatory processes, workflows, and tasks.