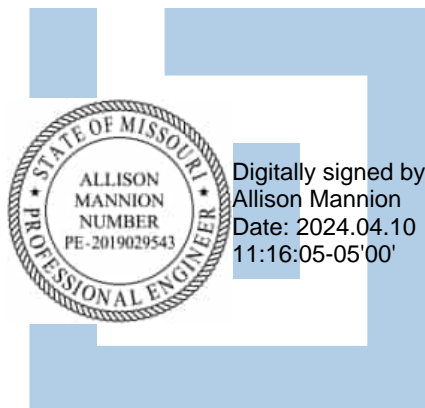




CITY OF ROCK HILL

827 North Rock Hill Road Rock Hill, MO 63119

Stormwater Master Plan



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1 EXECUTIVE SUMMARY

The City of Rock Hill hired Lochmueller Group to prepare a Stormwater Master Plan (SWMP) to help the city identify localized stormwater issues throughout the community. This plan is designed to assist the city with prioritizing the identified and known problem areas, address existing and anticipated future stormwater related concerns, provide a detailed analysis of the high priority issues, and provide recommendations to resolve these problems.

1.1 Scope of Work

The following is a general outline of the project tasks:

1. Data Collection and Mapping (Public Outreach)
2. Problem Identification (Field Survey)
3. Stormwater Needs Assessment (Analysis)
4. Draft Recommendations (Public Meetings)
5. Final Report

1.2 Review and Updates

This document should be considered a roadmap that Rock Hill can use to make a reasonable effort to resolve many of the stormwater related issues in the city. As it is a 'living document', it should be updated as projects are completed, and new issues are identified. Changes should be made to the document to reflect those updates.

1.3 Recommended Construction Projects

Initially, thirteen projects were identified as localized stormwater issues. Categories were identified to prioritize the list of projects such as number of residents a project would impact, benefit/cost ratio, safety, risk to property, roadway accessibility and severity of the issue.

The recommended projects fall into three categories: improvement to storm sewer collection system, storage and streambank stabilization.

2 MASTER PLAN OVERVIEW

2.1 Introduction

The City of Rock Hill is located in central St. Louis County and is part of the Deer Creek watershed. The Metropolitan St. Louis Sewer District (MSD) owns the public storm sewer infrastructure throughout the City. The City is a co-permittee on MSD's municipal separate storm sewer system (MS4) Permit, and must also meet the requirements of the permit. All of the stormwater in Rock Hill that ends up in the storm sewer system will eventually flow into Deer Creek.

As the City of Rock Hill continues to experience stormwater runoff issues in various areas, it was determined that a Stormwater Master Plan (SWMP) would be an important planning tool to ensure that the city's needs are properly evaluated. A SWMP will allow the City to make informed decisions for the greatest benefit to the areas experiencing stormwater runoff issues.

The City contains residential, industrial and commercial development. The commercial development is primarily along Manchester Road, the industrial development is along Rock Hill Industrial Ct, and the rest of the City contains residential buildings. The City is completely developed, with a lot of impervious surface. The surrounding areas are similarly developed. When flooding events occur, the flooding is urban flash flooding, especially along Deer Creek.

2.2 Purpose

By planning ahead and assessing stormwater runoff infrastructure improvements required to support current and future goals, the City of Rock Hill will be able to identify and prioritize the stormwater needs of its citizens and improve the quality of life of its community.

2.3 Planning Approach

For this SWMP to be successful, there must be a review of the City of Rock Hill's current and future planning efforts. Infrastructure improvements must be aligned with land use patterns to sustain development. In addition, the watershed characteristic of the City and surrounding communities that impact the Rock Hill's stormwater drainage systems and floodplains need to be assessed holistically. In order to visually represent and analyze the different data sets, Lochmueller employed Geographic Information Systems (GIS) data driven web applications to collect, store and analyze data, and prepare recommendations and present design solutions. This helps to ensure capital improvements are coordinated and implemented for a greater citywide benefit at reduced long-term costs.

2.3.1 Review of Existing Conditions and Problem Areas

Step one involved conducting an audit of the existing conditions of the City of Rock Hill. Information about stormwater drainage concerns were acquired from the MSD, as well as from Rock Hill city staff with knowledge of history of stormwater issues in the area. With identification of the problem areas and properties with known issues, a list of 228 targeted properties was created.

The three main watersheds in the City were identified and delineated. These were then further delineated into subwatersheds to assist in hydraulic and capacity analysis. An exhibit showing the three main watersheds and subwatersheds is located in **Appendix A** in Exhibit 1 Drainage Area Map.

2.3.2 Data Collection & Mapping

As part of the SWMP process, public involvement was completed as an integral process in the data collection phase. Letters were sent to all of the targeted properties (included in **Appendix B**). Lochmueller representatives went out during the time period of February 7th, 2023 to April 3rd, 2023 to collect data in the field. Targeted parcels were inspected for any stormwater related issues and stormwater issues were discussed with residents of the homes. Many residents also called the Lochmueller representatives to discuss over the phone, issues they had experienced at their property. When available, residents sent in photos and videos of the stormwater problems observed. The photos are included in Section 5 of this report, and all photos and videos have been shared with the City of Rock Hill officials via dropbox. The map showing the data points collected in the field can be found in Exhibit 2, the Fieldwork Progress Exhibit located in **Appendix A**.

2.3.3 Problem Identification

The problems observed in the City included roadway flooding, main structure building flooding, backyard flooding, basement backups, driveway flooding, sink holes, storm sewer system deterioration and channel ditch erosion.

2.3.4 Stormwater Needs Assessment

A stormwater needs assessment was conducted which analyzed the data collected in the field. The number of problems in an area as well as the severity of the problems identified were considered. Exhibit 3 indicates the severity of the problems. A score measuring the severity of the identified problem was given to each data point collected. The severity score ranged from one to five. A one was an issue that was not severe, causing no damage to property, roads, yards or buildings. A score of three was determined for identified problems that were causing some damage, but not disastrous. A score of five was given to issues that had major potential damage to property, roads, yard or buildings.

Exhibit 4, Flooding Problems, Dominant Issue, shows the number of problems experienced in parts of the City. Both exhibits are included in **Appendix A**. Using this information, the areas of greatest need in the City were identified.

A hydraulic analysis was conducted to determine capacities of the stormwater system in Rock Hill, and using the subwatershed drainage areas, areas of insufficient capacity were identified throughout the City.

From this information the areas where projects were recommended were identified. These identified solutions are discussed in Section 5.

2.3.5 Public Outreach

The public was involved in this project for the duration of the project. Letters were sent to notify the public of this project, with contact information for them to share information as well as opportunities to meet the Lochmueller representatives in the field. Lochmueller representatives also met with the City Council on November 7 to discuss the findings of the field investigations and the recommended projects.

A Public meeting was held virtually on November 15th to share the findings of the field work and the recommended projects with the residents of Rock Hill. Letters were sent out via mail, email and signs were posted outside of public hall advertising the meeting to residents. Announcements were also made on the City's website <https://www.rockhillmo.net/>. A copy of the letter sent to residents can be found in **Appendix B**.

2.4 Project Guidelines

The projects that have been identified as recommended projects for this SWMP address the following concerns:

1. Concerns of public safety
2. Concerns of roadway accessibility
3. Problems caused or worsened by public projects
4. Upstream conditions causing adverse downstream impacts
5. Projects that a property owner would not be able to complete themselves due to involving other properties, agencies or extend beyond the City's jurisdiction.

Projects were also evaluated to determine the number of residents a project would benefit, the number easements that would be required, the opinion of probable cost and the benefit/cost ratio. Other factors such as safety concerns, risk to property and roadway accessibility were also considered.

3 PROJECT PLANNING AREA

3.1 Location and Background Information

This master plan is a planning document to address the stormwater needs in the City of Rock Hill. Rock Hill had an estimated population of 4,130, based on the 2020 census data. The city is located south of Litzsinger Road, east of S Brentwood Boulevard, north of Bismark Avenue and west of Des Peres Road. Rock Hill has a total area of 1.2 square miles.

3.1.1 Location Maps

An overall project planning area map is included in Exhibit 5 in **Appendix A**.

3.2 Environmental Resources Present

3.2.1 Land Features

3.2.1.1 Soils

A review of the Web Soil Survey indicates that Rock Hill's predominant soils types are Urban land-Harvester complex and Urban land-Harvester complex, karst. Soil types can be classified into "hydrologic soil groups" based on their ability to infiltrate water, ranging from "Group A" soils with higher infiltration rates to "Group D" soils with low infiltration rates. These classifications are widely used in hydrologic calculations to determine runoff flow rates and volumes for the sizing of infrastructure to manage storm water. The soils in Rock Hill are categorized primarily as "Group C" soils.

A copy of the USDA NRCS soils map for the study area is included in **Appendix A** as Exhibit 5.

3.2.1.2 Karst Features

Karst features (include surface depressions, sinkholes, caves, fissures and karst springs) are present in the City of Rock Hill and are used as drainage features in the city. In areas of known Karst topography, any excavation will likely require additional geotechnical review.

3.2.2 Watersheds

The city is broken up into three watersheds. Water primarily drains to one of three creeks: Rockhill Creek, Warson Woods Creek and Deer Creek. Rockhill Creek and Warson Woods Creek eventually drain into Deer Creek.

Each of these watersheds was divided up into subwatersheds to determine the drainage patterns and to calculate the flow. The map of the watersheds and subwatersheds is included in Exhibit 1 Drainage Area Map.

3.2.3 Floodplains

The FEMA floodplain maps were reviewed for the planning area. The FEMA maps are included in **Appendix A**.

The effective floodplain and preliminary floodplain mapping were reviewed from the Missouri State Emergency Management Agency (SEMA).

Floodplain and floodways are located along each of the three creeks running through the City. Floodways are part of the active channel, meant to convey water in a 100-year rain event without increasing the base flood elevation more than the specified amount. The floodplain in the area adjacent to the river, meant to help attenuate flood waters by allowing the flood waters to spread out.

The effective mapping from FEMA, from 2015, has development along and in the floodway along all three of the main creeks that run through Rock Hill. The FIRM Panels that include the City of Rock Hill are 29189C0326K effective 2/4/2015 and 29099C0050F, effective 6/20/2019.

Rock Hill Creek's floodway includes part of four house structures and Des Peres Ave (between Almentro Ave and Ernst Ave), which is the only access road to the City of Rock Hill Public Works building. The 100-year floodplain extends beyond the floodway to include house structures and yards of properties along Madison Ave, Brownbert Ave, W G Computer School Elementary, Country Hills Dr, and W Thornton Ave.

There is development within the floodplain and floodway in the City. The Deer Creek floodway and floodplain are the largest throughout the City but the three creeks through the city all have development in the floodplain and experience flash flooding impacting residents and businesses in the area. A map indicating the FEMA effective flood mapping is included in Exhibit 7.

The Rock Hill Industrial, both north and south of Manchester Rd, is located in the floodway and experiences frequent flooding.

The houses along Des Peres Ave are all in the floodway or 100-year floodplain and periodically experience flooding in their backyards and creek erosion from flash flooding events in Sabago Creek. The preliminary SEMA mapping shows a decrease of the 100-year floodplain along Des Peres, taking several of the houses out of the floodplain. A few houses still remain in the floodway. The changes in the floodplain mapping between the effective and preliminary mapping is included in Exhibit 8, Preliminary Changes in FEMA Mapping.

Rock Hill Creek's floodway includes part of four house structures and Des Peres Ave (between Almentro Ave and Ernst Ave), which is the only access road to the City of Rock Hill Public Works building. The 100-year floodplain extends beyond the floodway to include house structures and yards of properties along Madison Ave, Brownbert Ave, W G Computer School Elementary, Country Hills Dr, and W Thornton Ave. A project was completed by MSD to reinforce and build up the creek walls creating a channel though this area. After the completion of this project, the residents stated they have had very few if any flooding concerns. The preliminary mapping in this area removes a majority of the houses from the floodplain. The preliminary flood mapping, not yet published but able to be viewed on SEMA's website, indicate much of Madison Ave and the Elementary School will be removed from the floodplain or the floodplain will be reduced.

Ernest Ave, the access road to the public works building, is in the Rock Hill Creek floodway and remains in the floodway in the preliminary mapping.

3.3 Land Use, Population Trends and Projections

The land use of the City of Rock Hill is comprised of residential, commercial and industrial land use. The commercial land use is concentrated along Manchester Road and the industrial land use is primarily along the Rock Hill Industrial Court.

Rock Hill has had a stable population over the 20-year period described above. It would be proper to presume that the population of the city would remain steady. Significant growth (including commercial) in Rock Hill is unlikely. The City is bound on all sides by neighboring cities including Ladue and Brentwood to the north, Webster Groves and Glendale to the South, and Warson Woods to the west.

3.4 Infill Development

Rock Hill is completely developed, however one type of development that is ongoing throughout in the City is infill development or developing parcels that are already developed. This happens when a parcel with an existing structure, has the structure removed and replaced with a larger structure or an addition to an existing structure. This does not appear to be causing any major issues in the City currently, but it has caused issues in neighboring cities in recent years. Therefore there may be a lag in effect and the City has the opportunity to get ahead of the problem.

4 EXISTING FACILITIES

4.1 Stormwater

Wet weather is unavoidable and effective stormwater management is necessary to protect existing infrastructure and for supporting future development. Various issues, which can include flooding, damage to public and private property, erosion and sedimentation, habitat loss and water quality degradation, are all concerns when evaluating stormwater runoff control strategies to protect the lives of citizens and physical assets of a community. Successful stormwater management serves to mitigate negative impacts and sustain future growth.

4.1.1 History

The stormwater drainage system in Rock Hill is made up of creeks, culverts, storm sewers, and sink holes. A majority of the storm sewers were installed with the construction of the houses, although storm sewers have continued to be installed to alleviate drainage and flooding issues. There are areas where these issues continue, and storm sewers are needed. Several networks of storm sewers end at sink holes, with the intent for the stormwater to drain down the sink hole. However, these were likely designed when there was much less development in the City.

4.1.2 Present Conditions (Collection System)

The present conditions of the stormwater system (creeks, culverts, and storm sewers) range from good to poor. Where the conditions are poor, temporary road closures and property flooding are noted and have led to complaints from property owners.

4.1.3 Adequacy of Current Facilities

The adequacy of current stormwater facilities in Rock Hill ranges from adequate to inadequate. If the properties and roads do not flood during rain events, then the stormwater facilities would be deemed adequate. However, if flooding of roads and properties occurs, then the stormwater facilities for that area would be deemed inadequate. The risk level in these areas is also assessed based on proximity to flooding, flood zone and observed adverse impact to public infrastructure and private property. Areas with inadequate facilities were evaluated for solutions, which are discussed in Section 5.

4.2 OMCI Stormwater Ordinance

The City of Rock Hill has an agreement with MSD through Ordinance No.15693 - Deer Creek OMCI (Operations Maintenance Construction Improvements) Reimbursement Program for the City of Rock Hill, Agreement (13487) with the MSD. The OMCI Tax rates are listed below. These funds can be used for stormwater improvements in the City of Rock Hill.

TABLE 4-1 OMCI TAX RATE PER \$100 ASSESSED VALUE

Property Type	Amount
Residential	\$0.062
Agricultural	\$0.010
Commercial	\$0.077
Personal Property	\$0.0930

4.3 MSD Stormwater Rate Change

In April 2024, a rate change for MSD will be voted on to approve.

If this stormwater rate passes, MSD anticipates collecting approximately \$34 million each year to be used for stormwater capital projects.

If the stormwater rate change does not pass, the OMCI tax district will remain for the City and the funds will be available annually for the City to use for stormwater work.

5 RECOMMENDED PROJECTS

In this section, all of the recommended projects are discussed. The reason the project is recommended, the recommended work and the cost are all include for the projects. All of the detailed opinions of probable cost and exhibits of the recommended work can be found in **Appendix D**. An exhibit showing the project locations in a map of the City of Rock Hill is included as Exhibit 6 in **Appendix A**.

5.1 Oday Ave Storm Sewer (From Oakhaven Ave to Sherrell Ct) (P001)

The properties on Oakleaf Dr to the west of Oday Ave sit higher than the properties on Oday Ave. Water flows from those properties to the back yards on the west side of Oday Ave. The houses along the west side of Oday Ave currently have sump pumps in the back yard that collect the stormwater and pump it out to the street, where it eventually flows to 1225 Oday Ave. The property at 1225 Oday Ave is the low spot in the area, including Oakleaf Dr, Oday Ave and Old Warson Rd, and has a sink hole on the property. It is naturally collecting all the stormwater from Oakleaf Dr, Oday Ave and Old Warson Rd which goes into the sink hole or into the storm sewer inlet on the northeast corner of the property.



PHOTO 5.1 PROPERTY AT 1225 ODAY AVENUE

The recommended solution for this issue is to construct 520 linear feet (LF) of 15-inch storm sewer to collect and convey the storm water to the storm sewer system at 1225 Oday Ave. There is a narrow parcel between Oday Ave and Oakleaf Dr, 9833 Oak Haven Ave, that is ideal to purchase and use as a storm sewer easement between the two streets. This storm sewer could collect storm water and flow North towards 1225 Oday Ave and outlet into a detention pond. The purchase of the property at 1225 Oday Ave is included in the cost of this project, as it is important to keep this property undeveloped and used for storm water collection, detention and storage. Development on this property would likely have issues with storm water, as it is the lowest elevation in the area and the existence of the sink hole on the property.

5.1.1.1 Maps

A map that depicts this alternative can be found in **Appendix D Exhibit P001**.

5.1.1.2 Easements

This project requires the acquisition of two parcels. It impacts 21 properties and benefit 10 properties.

5.1.1.3 General Estimate of Costs

Oday Ave Storm Sewer (P001) has an opinion of probable cost of **\$812,000**. A detailed cost estimate can be found on the exhibit in **Appendix D**.

5.2 Fredric Ct Storm Sewer Extension (P002)

The properties on the north side of Frederic Ct are impacted by water flowing from Rockford Ave and Litzsinger Rd to the east and the north. Water flows down through the backyards from 9329 to 9337 Frederic Ct. It is recommended to construct approximately 350 LF of 12-inch storm sewer with inlets along the backyards of these properties to collect and convey the storm water along the existing drainage path.

The properties on the west side of Frederic Ct are also experiencing stormwater related flooding issues from flow coming down Frederic Ct from Litzsinger Rd. The property at 9338 Frederic Ct has experienced flooding if their house and garage from stormwater flowing down from Litzsinger. The recommendation for this area is to extend the storm sewer from the existing inlet north, towards Litzsinger Rd to capture the flow coming from Litzsinger Rd. This is approximately 250 LF of 12-inch storm sewer and inlets and connects to the other reach of 12-inch storm sewer.



PHOTO 5.2 WATER FLOWING THROUGH THE BACKYARDS OF THE PROPERTIES ALONG THE NORTH SIDE OF FREDRIC CT. FLOW FROM 9333 TO 9335 FREDERIC CT.

5.2.1.1 Maps

A map that depicts this alternative can be found in **Appendix D Exhibit P002**.

5.2.1.2 Land Requirements

There is an existing sanitary sewer along these back yards, so there is likely an existing easement that might be able to be used. This alternative will require no new permanent easements. This project will benefit 6 properties in this area.

5.2.1.3 General Estimate of Costs

Frederic Ct Storm Sewer Extension (P002) has an opinion of probable cost of **\$176,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.3 Old Warson Storm Sewer and Storage (P003)

There is an unfunded MSD project, Old Warson Storm Sewer (13583) that involves the construction of 1,485 feet of 24 to 30-inch storm sewer from McKinley Ave to Deer Creek, crossing S McKnight Rd.

With the addition of underground storage along McKinley Ave, an 18-inch storm sewer can be constructed from McKinley Ave to connect into the existing 18-inch storm sewer at N Rock Hill Rd and Old Warson Rd. With storage upstream in this subwatershed, we will be able to keep the existing sewer in place downstream of inlet 21L3-078D. This will make construction more feasible, as it will not need to cross S McKnight Rd, and will reduce the length of storm sewer required to 930 LF of 15-inch sewer.

The storm sewers in this region are inadequate for accommodating the 15-year 20-minute design storm specified by MSD as the design capacity for their stormwater systems. To address the surplus stormwater that exceeds the system's capacity, one solution is to incorporate wet weather storage. Consequently, MSD's flood detention volume equation was applied to calculate the necessary volume, which plays a crucial role in determining the required underground storage capacity. The detention volume is evaluated based on the TR-55 methodology. Using this method, it was determined that 4,100 cubic feet (CF) of underground storage is required. The calculations are included in Appendix F – Calculations.



PHOTO 5.3 OLD WARSON RD AND MCKINLEY AVE.

5.3.1.1 Maps

A map that depicts this alternative can be found in **Appendix D, Exhibit P003**.

5.3.1.2 Land Requirements

This alternative will require one easement. It will impact five properties and benefit five properties, and drivers along McKinley Ave.

5.3.1.3 General Estimate of Costs

The opinion of probable cost for this project is **\$587,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.4 Brownbert Ave Storm Sewer Extension (P004)

The residents near the intersection of Brownbert Ave and Madison Ave experience stormwater flowing from the north, down through the back yards of the 9700 block of Madison Ave towards the Rockhill Creek improved channel. The recommended work to help mitigate this backyard channel from occurring, is to capture and divert the stormwater into the storm sewer system. The stormwater will still be going to the same channel but will be conveyed via storm sewer instead of overland flow. This will involve constructing 200 LF of 18-inch storm sewers and inlets.

5.4.1.1 Maps

A map that depicts this project can be found in **Appendix D, Exhibit P004**.

5.4.1.2 Land Requirements

This alternative will require no easements and will benefit one property.

5.4.1.3 General Estimate of Costs

The opinion of probable cost for the long-term solution is **\$101,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.5 Remington Lane Stormwater Storage (P005)

There is a system of storm sewers, channels and inlets that direct stormwater to sink holes located at 2508 and 2516 Remington Lane. The two properties currently experience backyard flooding from events where the sink hole can't drain the stormwater as a fast enough rate. It is recommended that overflow rain gardens be installed at this location to handle excess water that is not able to quickly drain into the sink hole. In addition to the rain gardens, upstream storage under the roadway on Golden Gate Drive should also be added as part of this stormwater system to store stormwater upstream.

The rain garden's volume is determined by the quantity of water collected from the roof area, which is measured using the house's size and pitch angle. To calculate this volume, MSD regulations regarding the roof's PI factor during a 100-year 20-minute design storm are incorporated. Through this method, it was determined that two rain garden sizes will be 219 and 354 cubic feet.

The flood detention volume equation of MSD was utilized to compute the essential volume, which holds a pivotal role in the determination of the necessary underground storage capacity. The evaluation of the detention volume is conducted according to the TR-55 methodology. Through this approach, it was ascertained that a requisite underground storage capacity of 9,056 cubic feet (CF) would be needed. The calculations are included in Appendix C – Calculations.

5.5.1.1 Maps

An exhibit that depicts this project can be found in **Appendix D, Exhibit P005**.

5.5.1.2 Land Requirements

This project requires the acquisition of two easements. It benefits two properties, and two properties would be impacted.

5.5.1.3 General Estimate of Costs

The opinion of probable cost is **\$176,000**. A detailed opinion of probable can be found on the exhibit in **Appendix D**.

5.6 North Des Peres Streambank Stabilization (P006)

Just before Sabago Creek and Warson Woods Creek meet, Sabago Creek is eroding the bank at 1222 Des Peres Ave. There is a creek wall falling and the water is cutting behind the wall, eroding the creek bank further. Some creek bank stabilization should be done to help the creek bank erosion in this area, including cutting the creek bank back, stabilizing with rock lining and including biostabilization.

5.6.1.1 Maps

An exhibit that depicts this project can be found in **Appendix D, Exhibit P006**.

5.6.1.2 Land Requirements

This project will require one easement. This project will benefit one property.

5.6.1.3 General Estimate of Costs

The opinion of probable cost for this project is **\$79,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.



PHOTO 5.4 CREEK BANK EROSION ALONG SABAGO CREEK

5.7 Central Des Peres Streambank Stabilization (P007)

The properties along Des Peres Ave back up to Warson Woods Creek. The cut bank of the creek is eroding closer to the house structures over time, and in the case of 1210 Des Peres Ave, has caused significant erosion in their back yard. The creek is prone to flash flooding and floods the back yards in many of the properties. At least one house, 1202 Des Peres Ave, experienced main structure building flooding in 2022, when their basement was flooded. Most of the properties have some sort of wall along the creek, but this differs from property to property. There is a mix of concrete walls, modular block walls, stone walls and gabion baskets. To help mitigate the creek bank erosion, the west side of the creek bank between 1200 Des Peres Ave and 1214 Des Peres Ave can be stabilized by removing the existing walls along the creek, cutting back the creek bank, and stabilizing the creek bank with rock lining and biostabilization.



PHOTO 5.5 CREEK BANK COLLAPSE AT 1210 DES PERES AVE

5.7.1.1 Maps

An exhibit that depicts this project can be found in **Appendix D, Exhibit P007**.

5.7.1.2 Land Requirements

This project will require eight easements and will benefit approximately eight properties.

5.7.1.3 General Estimate of Costs

The opinion of probable cost for this project is **\$217,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.8 South Des Peres Streambank Stabilization (P008)

The creek bank along Warson Woods Creek as it crosses Des Peres Ave between 1106 and 1104 Des Peres Ave has some erosion of the grouted rip rap on the south side. The erosion is occurring near the toe of the creek bank, and could eventually become a more serious problem. The attached garage structure at 1104 Des Peres Ave is built approximately 15 feet from the top of bank, not allowing for cutting back of the bank to stabilize it. Further downstream, to the east, there are gabions that are approximately six feet high stabilizing the creek bank. One option is to add gabions up to a height of six feet, then cut the bank back at a 3:1 slope that is higher. The bank is approximately 12 feet. Another option is to cut the bank back at a steeper slope and use a turn reinforcement map (TRM) to help stabilize the bank.

5.8.1.1 Maps

An exhibit that depicts this project can be found in **Appendix D, Exhibit P008**.

5.8.1.2 Land Requirements

This project will require one easement and will benefit one property.

5.8.1.3 General Estimate of Costs

The opinion of probable cost for this project is **\$76,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

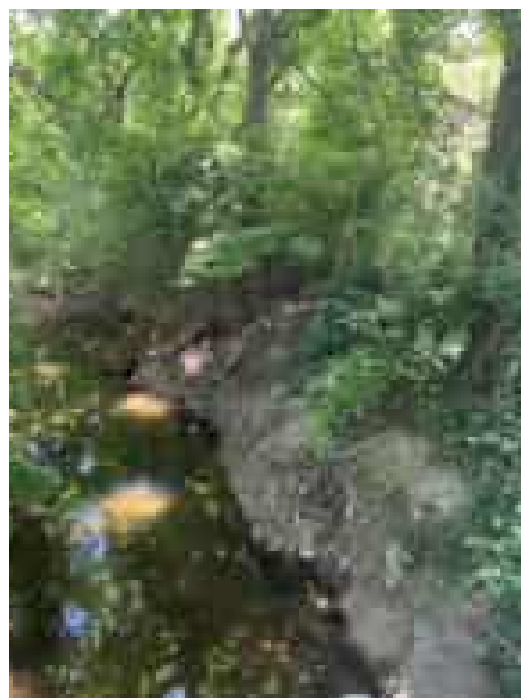


PHOTO 5.6 EROSION OF CREEK BANK NEAR 1104 DES PERES AVE.

5.9 Des Peres Buffer Zone Creation (Po09)

Another option that would help mitigate the creek bank erosion and flooding along Des Peres Ave would be to move the creek to the east. With the existing SEMA mapping, several of the house structures and many of the properties along Des Peres are in the floodway or floodplain. By moving the creek to the east, it will be further away from the house structures. The City of Rock Hill owns the two parcels the creek would be moved on to, 9955 Oak Haven Ave and 9930 Oak Haven Ave.

Rock lining and biostabilization will be required to stabilize the new creek bank and excavation of the new creek path and filling in of the existing creek will be required. This will involve coordination and permitting from the US Army Corps of Engineers (USACE) and the Missouri Department of Natural Resources (MDNR).



PHOTO 5.7 BASEMENT FLOODING AT 1210 DES PERES AVE ON AUGUST 3, 2022

5.9.1.1 Maps

An exhibit that depicts this project can be found in **Appendix D, Exhibit P009**.

5.9.1.2 Land Requirements

This project will require 13 easements and will benefit approximately 12 properties.

5.9.1.3 General Estimate of Costs

The opinion of probable cost for this project is **\$878,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.10 Des Peres Ave Buy Out (Po10)

One option for the properties along Des Peres Ave is a buyout of the property. This was one option considered, as they have flooded repeatedly in the past. FEMA has a property buyout program, which is a cost share program between FEMA and the local city or state. This is the most expensive of the options considered in the Des Peres Ave area. It would only solve the flooding and erosion problems for the properties that are bought out,

5.10.1.1 Maps

An exhibit that depicts this project can be found in **Appendix D, Exhibit P010**.

5.10.1.2 Land Requirements

This project will require six parcel acquisitions and will benefit six properties.

5.10.1.3 General Estimate of Costs

The opinion of probable cost for this project is **\$1.7M**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.11 Industrial Court Streambank Stabilization (S McKnight Rd to Manchester Rd) (P011)

The Rock Hill Industrial Ct industrial buildings are primarily located in the floodway. The buildings back in this area flood occasionally, with the July and August 2022 storms causing flooding with damage to buildings and equipment located on these lots. There is also erosion of Deer Creek on the east side of the creek. A few of the property owners have attempted to do their own creekbank stabilization, dumping rock back along the creek bank. The creek is eroding closer to the buildings and the owners have concerns. An effective mitigation measure for the erosion is to stabilize the creek banks with an engineered stabilization solution, with rock lining and biostabilization (instead of the rock that was dumped there). It is recommended to stabilize the reach of bank north of Manchester to 2609 Rock Hill Industrial Ct. This will help with the erosion, but unless this is combined with another solution, discussed below with projects P012 and P013, this will not mitigate the flooding occurring in this area.

5.11.1.1 Maps

An exhibit that depicts this project can be found in **Appendix D, Exhibit P011**.

5.11.1.2 Land Requirements

This project will require six easements and will benefit six properties.

5.11.1.3 General Estimate of Costs

The opinion of probable cost for this project is **\$832,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.12 Industrial Court Floodproofing (P012)

An option to help mitigate the flooding in the industrial area would be to incorporate dry floodproofing measures. These could be paid for by the property owners or the City could set up a cost share with the property owners and help them pay for these options.

FEMA has published guidance on Floodproofing Non-Residential Buildings, FEMA P-936. The flooding in this area is flash flooding, and the only type of floodproofing that can be considered are active methods of floodproofing. These are ones that don't have to be deployed. A few examples of these include installing a floodwall along the creek or installing special doors and garage doors on the buildings to make them water tight. For the purpose of the opinion of probable cost for this study, the installation of a floodwall was considered along Deer Creek.

5.12.1.1 Maps

An exhibit that depicts this project can be found in **Appendix D, Exhibit P012**.

5.12.1.2 Land Requirements

This project will not require easements and will benefit approximately six properties.

5.12.1.3 General Estimate of Costs

The opinion of probable cost for this project is **\$636,402**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.13 Industrial Court Buy Out (P013)

The properties in the Industrial Ct are all built in the floodway. This area is meant to flood when Deer Creek rises. In Exhibit 7, FMEA Flood Mapping, the industrial court is called out, and is shown completely in the floodway. One alternative that could be considered is returning this area to the floodway, so that instead of fighting the flooding that occurs, the City works with the river and lets this area flood to help relieve the flow during rain events. This is not likely a practical solution due to the amount of industrial development that currently exists along the Industrial Ct. A buyout of these properties is much more costly than some of the other options, such as floodproofing the buildings, however this option was considered as one of several options for flood mitigation in this area.

5.13.1.1 Maps

An exhibit that depicts this project can be found in **Appendix D, Exhibit P013**

5.13.1.2 Land Requirements

This project will require the acquisition of eight parcels and will benefit eight properties.

5.13.1.3 General Estimate of Costs

The opinion of probable cost for this project is **\$9.7M**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.14 MSD Identified Projects

MSD has identified several projects throughout the City that are in their system as projects necessary to help stormwater issues that are occurring. Exhibit 9, located in Appendix A, was created by MSD and shows the identified projects throughout the City. Several of these projects are unfunded, meaning MSD has identified them, but does not currently have the funding to complete them. The table in Exhibit 9 summarizes each of the projects. Projects Des Peres Avenue 1104 Creek Bank Stabilization (13885) and Old Warson Storm Sewer (13583) are identified on Exhibit 9, but are discussed in this SWMP because different ideas were developed from the existing idea developed by MSD.

5.15 Green Infrastructure Projects

There are green infrastructure projects the City can encourage private residents to complete such as rain gardens to help store water instead of flowing into the storm sewers.

At the intersection of Raritan Dr and Plainfield Dr, the road was resurfaced and the curb around the cul-de-sac was replaced. Residents in this area stated that the curbs around the cul-de-sac used to have curb cuts to allow stormwater to flow into the grass area of the cul-de-sac and infiltrate into the ground. When the curb was rebuilt, it did not include curb cuts. Adding curb cuts back into the curb in this area can help more stormwater infiltrate into the ground.

Small projects like these can help water get to previous areas where it can infiltrate.

5.16 Non-Capital Projects

Consideration should also be given to projects that are not capital improvement projects. Several non-capital projects are discussed below as well as the advantages, such as funding eligibility.

It is recommended to complete a stormwater ordinance. This will include infill development or any other new development in the City. It also should include buffer zones in floodplains between the creeks and houses, businesses or warehouses as well as making sure any new development is not occurring in the floodway or floodplain.

Additionally, the City needs to observe the MS4 minimum control measures. These include public education and outreach, public participation, illicit discharge detection and elimination, management of construction site runoff, management of post construction site runoff (new development and redevelopment), and good housekeeping in municipal operations. An example of these is to keep inlets free and clear of debris and educating homeowners to help the City keep inlets free and clear of debris.

FEMA has funding requirements for the national flood insurance program (NFIP). They require a floodplain administrator. The City General Provisions state that the City Administrator is designated as the floodplain administrator. It is recommended to update the Rock Hill Floodplain Ordinance, to include a Hazard Mitigation Plan. The City will also need to implement an action plan for a Substantial Damage Assessment using the Substantial Damage Estimator (SDE 3.0). This applies to both residential and commercial properties. FEMA has their own benefit-cost analysis tool that should be completed following a flood event. The City will also need to provide public outreach on local ordinances updates for permit acquisition and flood evaluation data and floodproofing technologies. Permits are a requirement for participation in NFIP.

The document 2022 State of Missouri Flood Damage Assessment Packet that contains additional information can be found in Appendix E. There are several funding opportunities through FEMA. Page 27 of the document in Appendix E summarizes several funding options.

Hazard Mitigation Grant Program (HMGP), which provides funds after a disaster is declared in Missouri. Building Resilient Infrastructure & Communities (BRIC) which focuses on proactive mitigation and innovative projects. This is a possible option for the industrial court area and would involve some cost sharing with the owners in this area. The final funding option is Flood Mitigation Assistance (FMA) which focuses on reducing or eliminating the risk of repetitive flood damage. This is for flood related projects with NFIP insured properties.

For flooding, FEMA options are more suitable. MDNR funding is available as well and focuses on water quality. This is administered through local / state funding. A pre-requisite for this funding is often a Stormwater Program (Stormwater Master Plan and/or Watershed Master Plan) that the Community (City of Rock Hill) or other Qualifying agencies (MSD) can use to identify applicable projects and apply for funding. A 319 Grant requires that a nine-element watershed-based plan that addresses impaired waters first be developed. Impaired waters include 303d listed or TMDL waters. MSD prepared a TMLD report for Deer Creek in 2021. This can be found at <https://portal.laserfiche.com/Portal/DocView.aspx?id=7797776&repo=r-a96260ce>. This program can be used to address Urban BMP Projects, Low Impact Development, and retrofits. This is applicable to solutions defined where we have sinkholes, providing pretreatment BMPs to address flash flooding from non-point sources.

5.17 Resiliency

The area within the City of greatest concern for resiliency is along Deer Creek. This area has historically seen the worst flooding and is likely to continue to see flood events occur. The water moving through the creek in this area has a high velocity and the banks are at risk of erosion. Creek bank stabilization can help with this. Returning the floodway to its natural state would help by naturally attenuating flow as it is supposed to do.

5.18 Constructability

There are constructability concerns with a few of the projects. The creek bank stabilization projects discussed in Sections 5.8 (P008) and 5.12 (P012), both involve creek bank stabilization near house or building structures. There is not a lot of room to work and get equipment into the area. Another issue for construction is the acquisition of easements where needed. To improve drainage issues, it is believed that the easements will be granted by the property owners. Traffic detours will occasionally be required for these projects as well.

5.19 Cost Estimates

A summary of the total project costs for all the stormwater alternatives is included in Section 6.

6 RECOMMENDED PROJECT COMPLETION

The recommended stormwater projects that were discussed in Chapter 5 are ranked below in order of priority. The priority score takes into account cost as well as number of homeowners a project benefits. The total of all stormwater alternatives cost is approximately **\$20.2M**.

6.1 Overall Project Cost

The projects are listed in Table 6-1 below, along with the cost of each project.

TABLE 6-1. OVERALL OPINION OF PROBABLE COST

Project Number	Project	Total Cost
P001	Oday Ave Storm Sewer (From Oakhaven Ave to Sherrell Ct) (P001)	\$812,000
P002	Fredric Ct Storm Sewer Extension (P002)	\$176,000
P003	Old Warson Storm Sewer and Storage (P003)	\$587,000
P004	Brownbert Ave Storm Sewer Extension (P004)	\$101,000
P005	Remington Lane Stormwater Storage (P005)	\$176,000
P006	North Des Peres Streambank Stabilization (P006)	\$79,000
P007	Central Des Peres Streambank Stabilization (P007)	\$217,000
P008	South Des Peres Streambank Stabilization (P008)	\$76,000
P009	Des Peres Buffer Zone Creation (P009)	\$878,000
P010	Des Peres Ave Buy Out (P010)	\$1,706,000
P011	Industrial Court Streambank Stabilization (S McKnight Rd to Manchester Rd) (P011)	\$832,000
P012	Industrial Court Floodproofing (P012)	\$4,904,000
P013	Industrial Court Buy Out (P013)	\$9,748,000
	Total Cost	\$20,292,000

6.2 Priority Ranking

A spreadsheet was developed to determine a benefit/cost ratio for the projects and was completed for each project. These sheets are included in **Appendix F**. The MSD Stormwater Project Prioritization System was used to score the Benefit Cost Ratios of each recommended project. The factors considered in the benefit/cost ratio were risk of flooding or erosion, damage to properties currently being experienced by flooding and erosion and number of homeowners that would benefit from a project. For both flooding and erosion, the risk to the house structure, garage, driveway and yard as well as risk to public roadways were scored. Greater weight was given to risk to houses, as this has the greatest and most devastating impact to a property.

They were rated as high, moderate, low or no risk and given a corresponding score of 3, 2, 1 or 0 respectively. The number of homeowners a project would benefit was scored with greater than 12 homes impacted receiving the highest score of 3, projects impacting between 5 and 11 properties was given a score of 2 and a project impacting 5 homes or less was given a score of 1. The last category evaluated was safety. Risk to human life as well as resiliency (potential for issues with emergency vehicle access, public transportation access, school bus access etc). The safety categories were rated as high, moderate, low or no risk and given a corresponding score of 3, 2, 1 or 0 respectively. Table 6.2 below indicates the summary and priority ranking of the projects.

TABLE 6-2. PRIORITY RANKING:

Project Number	Project Name	Benefit Score	Cost	Benefit/Cost Ratio
P008	South Des Peres Streambank Stabilization (P008)	2100	\$76,000	27.63
P007	Central Des Peres Streambank Stabilization (P007)	3300	\$217,000	15.21
P002	Fredric Ct Storm Sewer Extension (P002)	2100	\$176,000	11.93
P006	North Des Peres Streambank Stabilization (P006)	600	\$79,000	7.59
P004	Brownbert Ave Storm Sewer Extension (P004)	600	\$101,000	5.94
P011	Industrial Court Streambank Stabilization (S McKnight Rd to Manchester Rd) (P011)	4700	\$832,000	5.65
P009	Des Peres Buffer Zone Creation (P009)	4300	\$878,000	4.90
P005	Remington Lane Stormwater Storage (P005)	600	\$176,000	3.41
P010	Des Peres Ave Buy Out (P010)	3300	\$1,706,000	1.93
P003	Old Warson Storm Sewer and Storage (P003)	1000	\$587,000	1.70
P001	Oday Ave Storm Sewer (From Oakhaven Ave to Sherrell Ct) (P001)	1100	\$812,000	1.35
P012	Industrial Court Floodproofing (P012)	3600	\$4,904,000	0.73
P013	Industrial Court Buy Out (P013)	4700	\$9,748,000	0.48

6.3 MSD Benefit/Cost Analysis

A Benefit/Cost analysis was completed using MSD's benefit/cost analysis tool. This tool is divided up into different sections, based on the type of issue experienced in an area and divided up into problem categories and solution categories. The problem categories are separated by problems caused by streams and problems caused by storm sewers and overland flooding. For the problem categories, flooding in house structures, basements, garages, and yards is taken into consideration as well as roadway flooding. For the solution it inquiries about reduction of flow rate leaving the site for storage options, the age of existing infrastructure, pollutants and number of easements needed.

The benefit/cost ranking on the MSD tool aligns closely with the benefit/cost analysis completed in section 6.2 above. A summary of the rankings can be found in table 6-3 below and the full analysis can be found in **Appendix F**.

It should be noted that while the benefit/cost analysis is a tool in helping to determine the amount of impact a project can have for the cost of the project, cost is the major factor in the score. Frequency of the issue occurring is taken into account, however the severity of the issue is not taken into account, and it does not take safety and risk to life and property into account as strongly as the City would prefer. This is something the City should consider when evaluating the benefit/cost analysis.

TABLE 6-3. MSD BENEFIT/COST ANALYSIS

Project Number	Project	Total Cost	Benefit Cost Ratio	Number of Properties Benefit
P007	Central Des Peres Streambank Stabilization (P007)	\$217,000	5.53	8
P006	North Des Peres Streambank Stabilization (P006)	\$79,000	4.30	1
P008	South Des Peres Streambank Stabilization (P008)	\$76,000	4.21	1
P005	Remington Lane Stormwater Storage (P005)	\$176,000	3.07	2
P002	Fredric Ct Storm Sewer Extension (P002)	\$176,000	2.59	6
P009	Des Peres Buffer Zone Creation (P009)	\$878,000	1.64	12
P011	Industrial Court Streambank Stabilization (S McKnight Rd to Manchester Rd) (P011)	\$832,000	1.17	6
P003	Old Warson Storm Sewer and Storage (P003)	\$587,000	0.96	5
P004	Brownbert Ave Storm Sewer Extension (P004)	\$101,000	0.89	4
P013	Industrial Court Buy Out (P013)	\$9,748,000	0.27	6
P012	Industrial Court Floodproofing (P012)	\$4,904,000	0.24	8
P010	Des Peres Ave Buy Out (P010)	\$1,706,000	0.16	6
P001	Oday Ave Storm Sewer (From Oakhaven Ave to Sherrell Ct) (P001)	\$812,000	0.11	10
	Total Cost	\$20,292,000		75

6.4 Recommendations

It is recommended that the City prioritize projects that have a higher benefit/cost ratio. Projects that are lower cost and have less substantial design are more feasible to complete in the short term. Areas that have greater safety concerns should also be considered for completion in the short term.

Along Des Peres Ave, there are several areas requiring creek bank stabilization. These could be combined into one project with a phased approach.

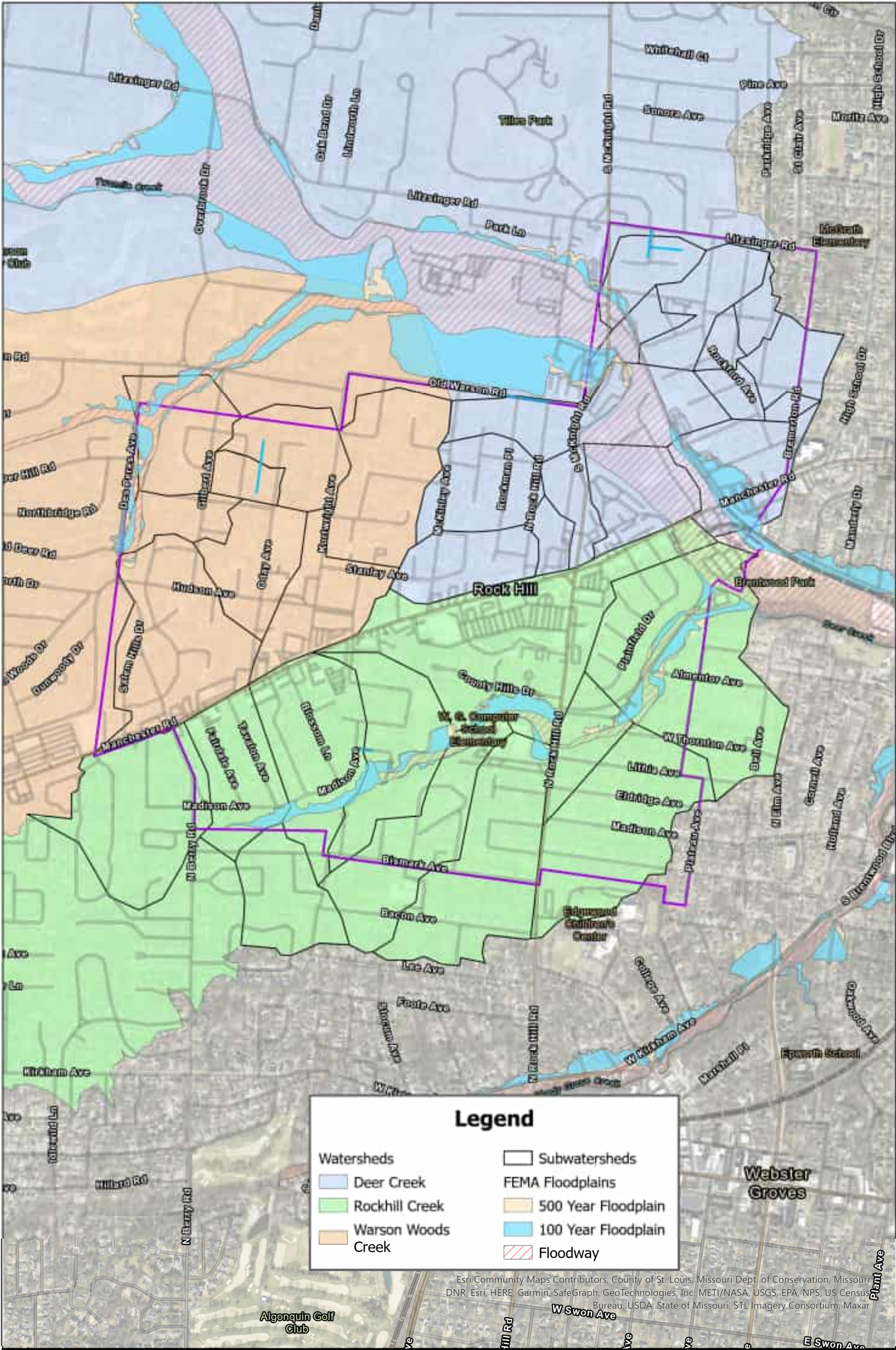
The City should meet with the property owners and stakeholders in the industrial area along Rock Hill Industrial Blvd and discuss options. MSD or the City could support the creek bank stabilization, however additional floodproofing would be an effort taken on by the owners and stakeholders in the area. For the floodwall or other floodproofing options, they would only be effective if all property owners participated.

Overall, the stormwater issues throughout the City primarily pertained to erosion of creek banks. No major flooding areas, outside the industrial parkway were observed. Most roads were usable by residents, even in large rain events. There were no observed impacts to access of emergency vehicles or other forms of transportation (school buses, private vehicles, etc.). The main areas where flooding occurs is the industrial parkway and the flash flooding occurring from Deer Creek.

Some smaller storm sewer extension problems can be completed to help capture and convey stormwater in areas that are lacking storm sewers, such as on Frederic Ln, Old Warson Rd, Brownbert Ave and Oday Ave.

APPENDIX A: PROJECT MAPS





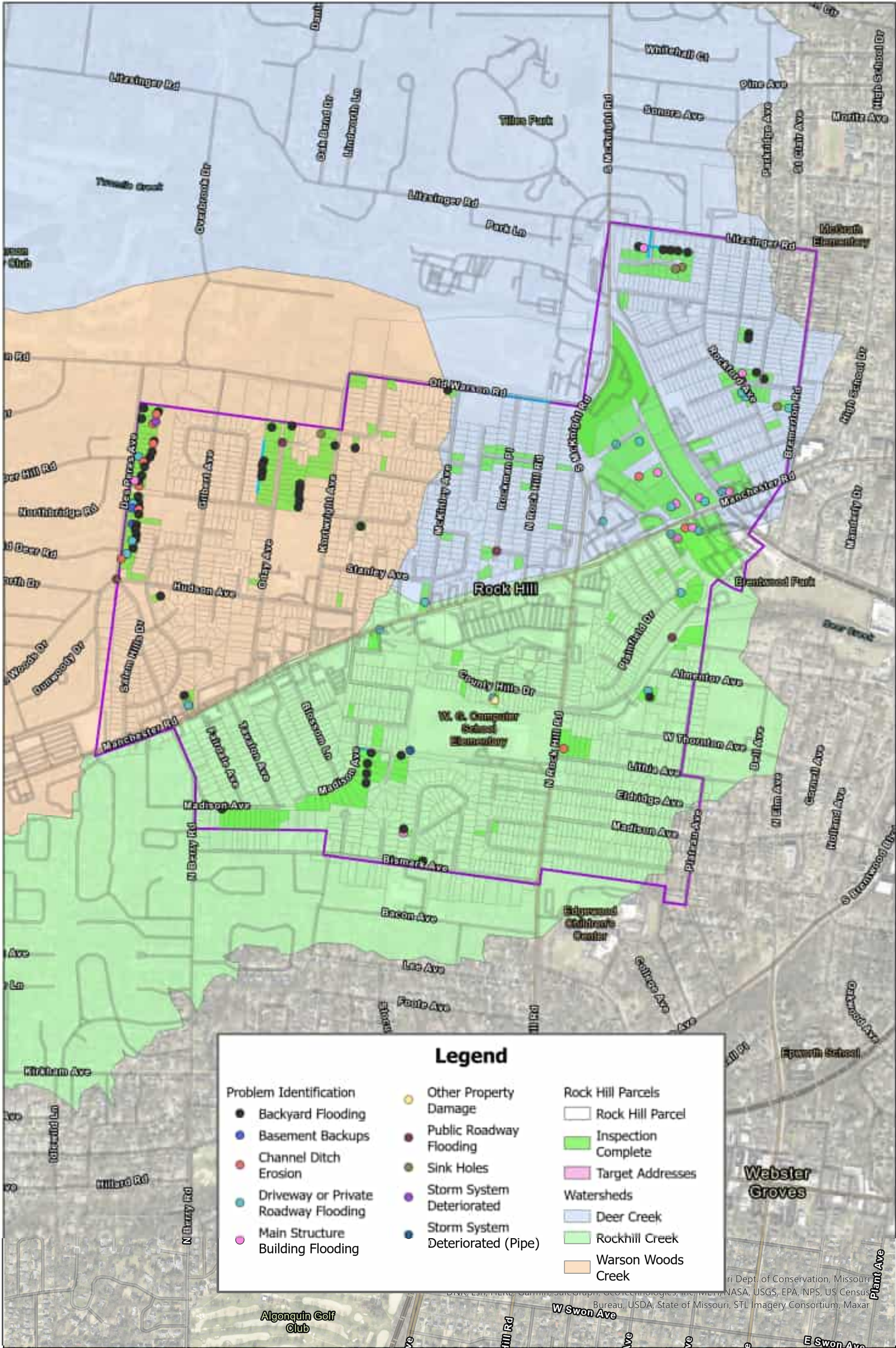
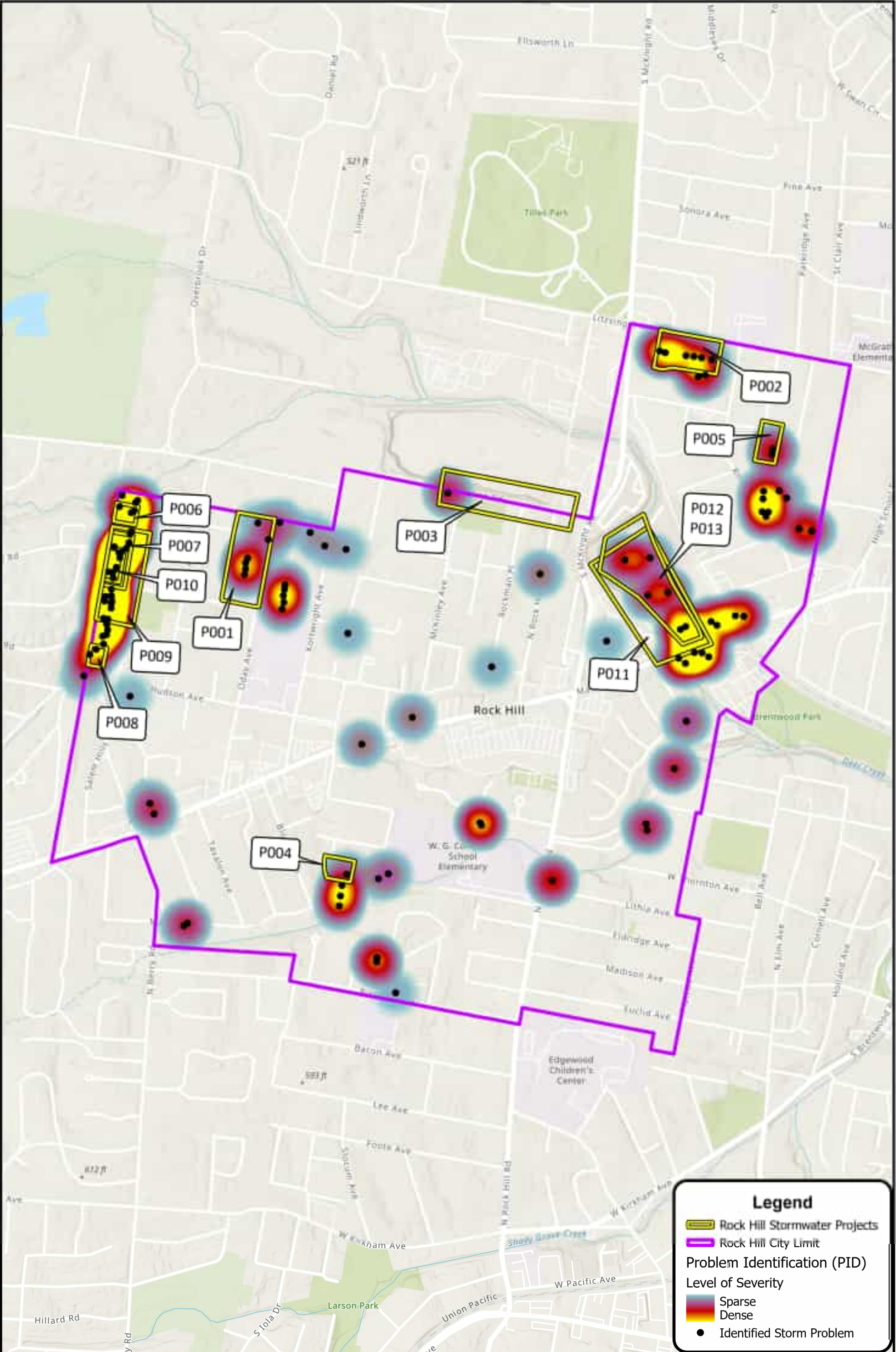


Exhibit 2
Problem Identification
Rock Hill, Missouri


0 250 500 1,000
Feet



411 N 10th Street, Suite 200
St. Louis, MO 63101




Legend


 Rock Hill Stormwater Projects


 Rock Hill City Limit

Problem Identification (PID)

Level of Severity

 Sparse

 Dense

 Identified Storm Problem

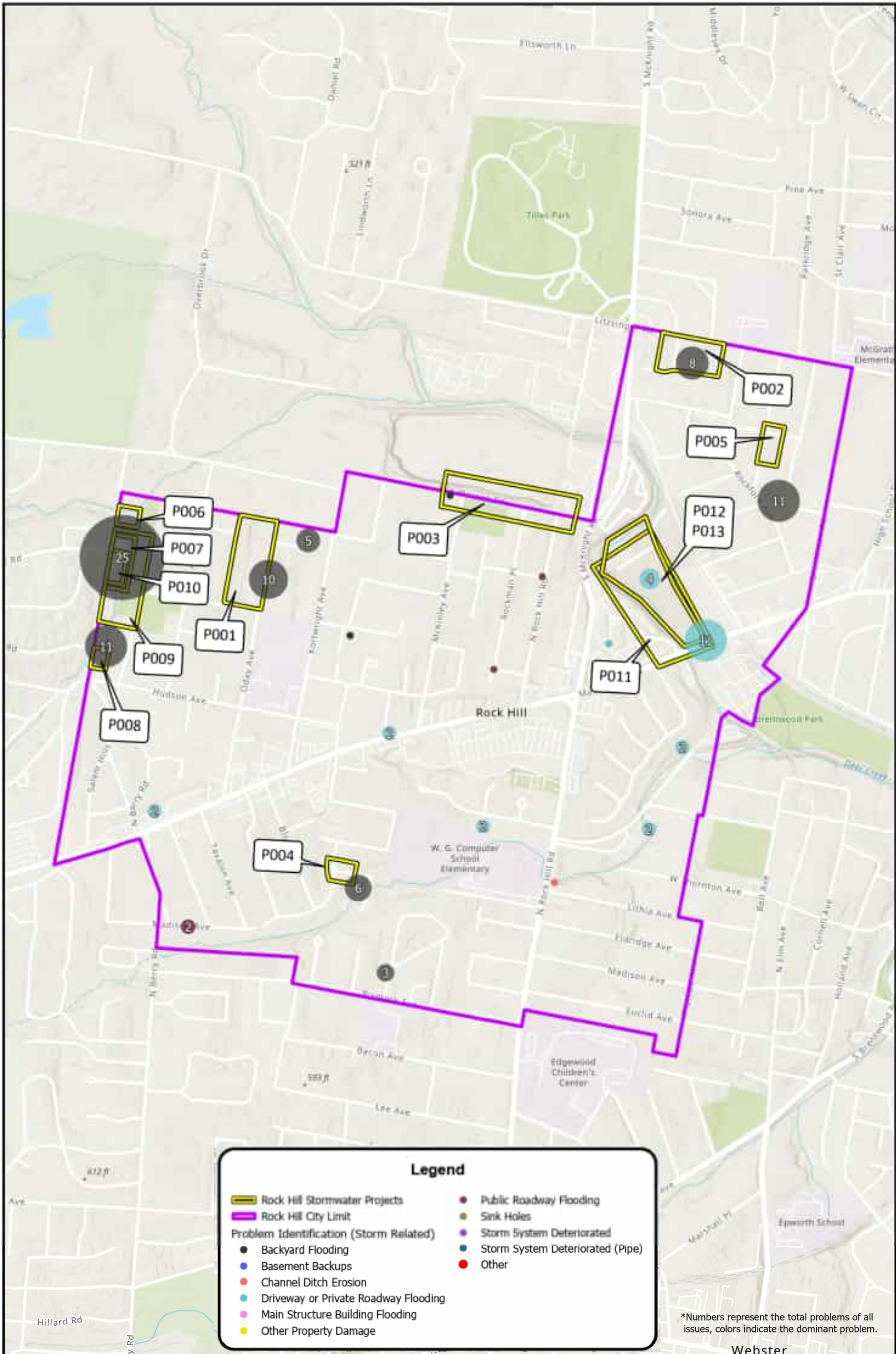


Exhibit 5

Custom Soil Resource Report

Soil Map



Custom Soil Resource Report


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)


Soils


 Soil Map Unit Polygons


 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot


 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip

 Sodic Spot


 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: St. Louis County and St. Louis City, Missouri

Survey Area Data: Version 24, Aug 23, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 22, 2022—Aug 25, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

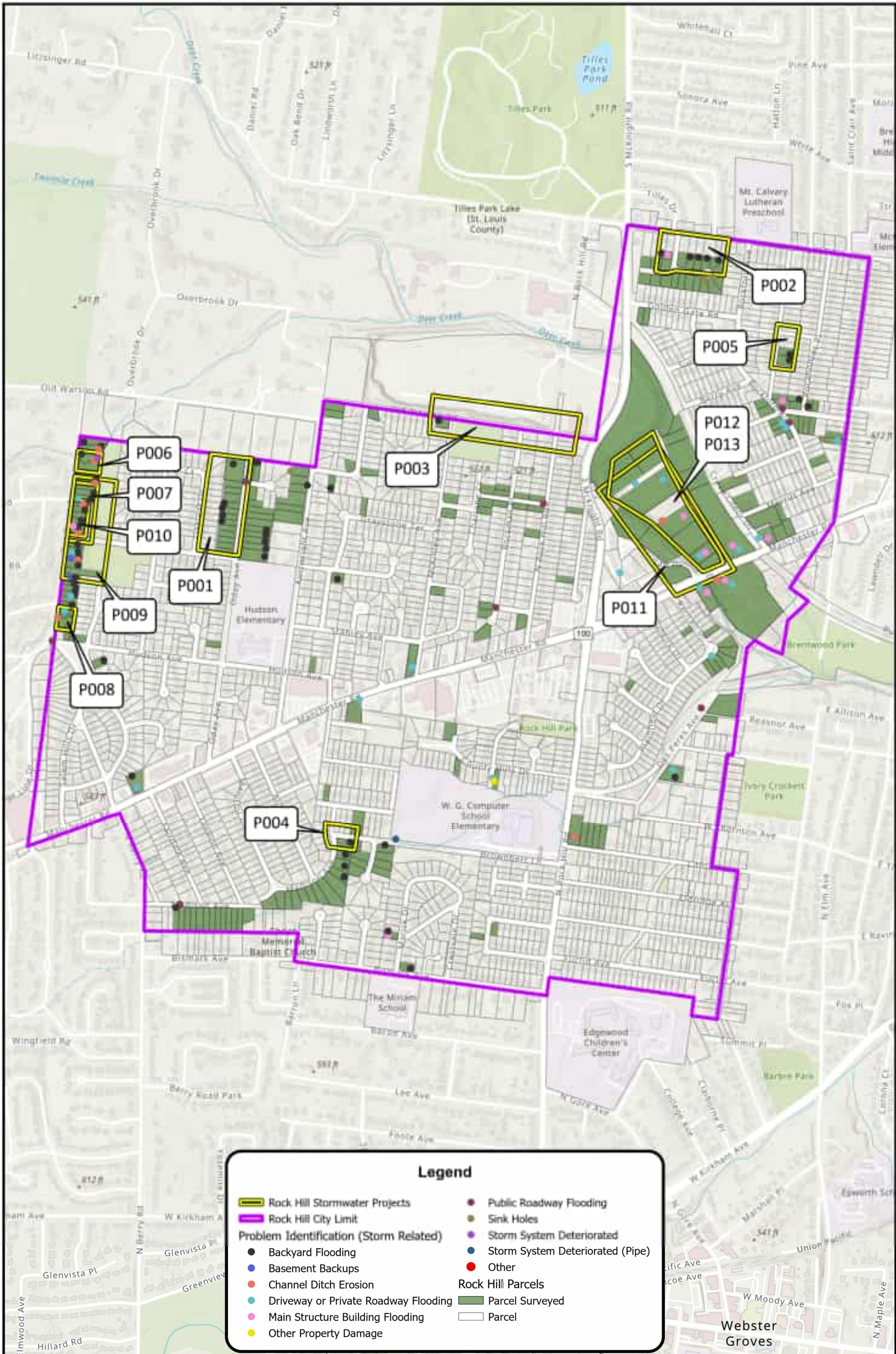


Exhibit 7 FEMA Effective Mapping



1/15/2024, 9:58:47 AM

Flood Hazard Zones

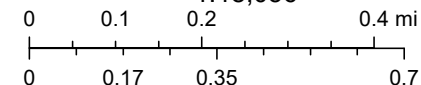
- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard

- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area with Risk Due to Levee

Flood Hazard Boundaries

- Limit Lines
- NP
- SFHA / Flood Zone Boundary
- Flowage Easement Boundary

1:18,056

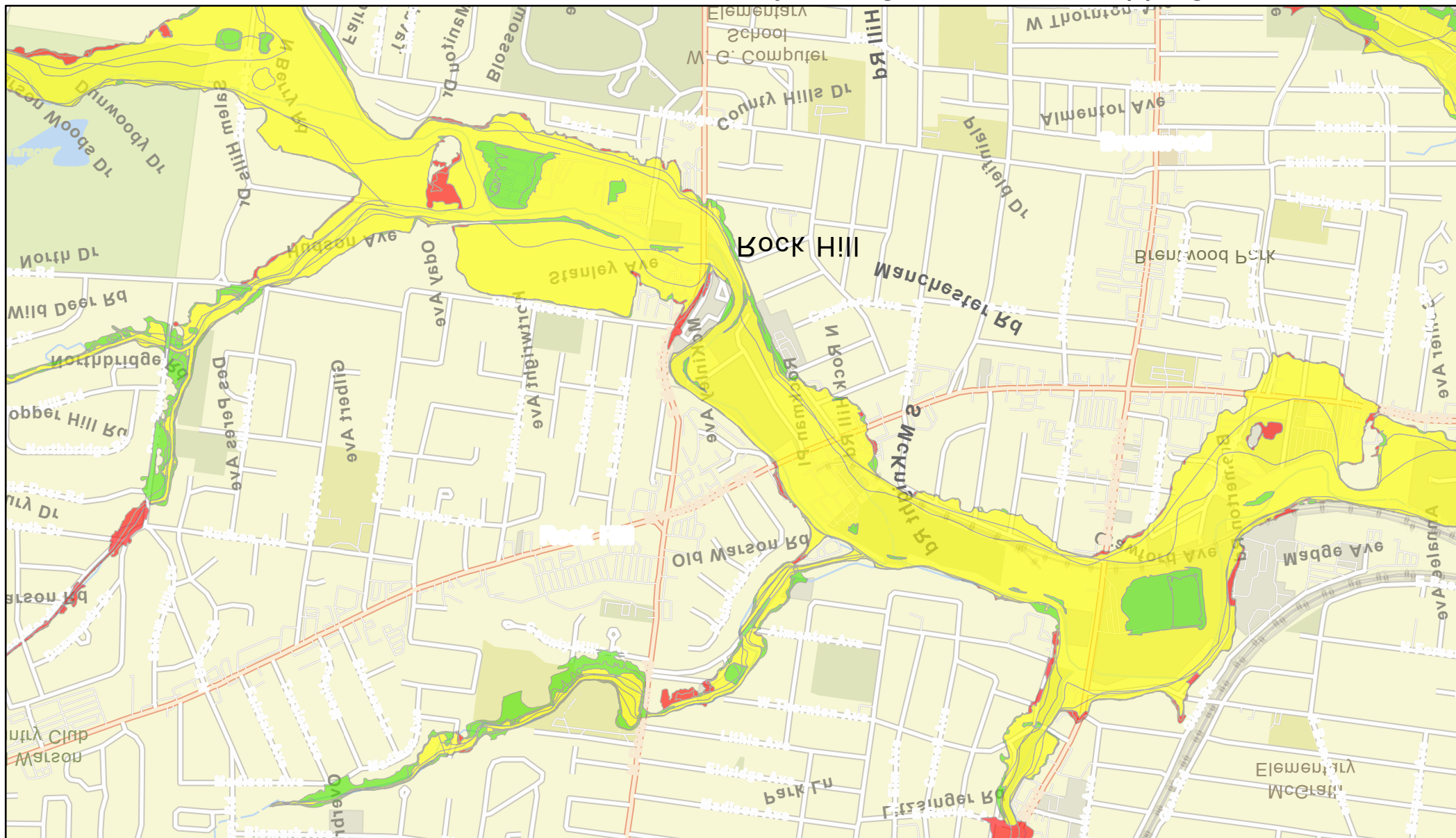


Esri Community Maps Contributors, County of St. Louis, Missouri Dept. of Conservation, Missouri DNR, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

Missouri SEMA Outreach

Esri Community Maps Contributors, County of St. Louis, Missouri Dept. of Conservation, Missouri DNR, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS | MoDOT |

Exhibit 8 Preliminary Changes in FEMA Mapping



3/21/2023, 1:46:30 PM

Preliminary Changes Since Last FIRM

Decrease

Increase

No Change

1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

Esri Community Maps Contributors, County of St. Louis, Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Missouri SEMA Outreach

Esri Community Maps Contributors, County of St. Louis, Missouri Dept. of Conservation, Missouri DNR, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA | MoDOT |

Exhibit 9

ORACLE NUMBER	PROJECT NAME	STATUS	SYMBOL	Description
11199	KORTWRIGHT AND OLD WARSON STORM IMPROVEMENT	Unfunded	Storm	CONSTRUCT 470 FEET OF 15-INCH TO 24-INCH DIAMETER STORM SEWER AND APPURTENANCES.
10311	ROCKFORD & CRAWFORD STORM SEWER	Unfunded	Storm	CONSTRUCT APPROXIMATELY 3825 FEET OF 12-INCH TO 48-INCH DIAMETER PIPE AND APPURTENANCES.
13583	OLD WARSON STORM SEWER	Unfunded	Storm	CONSTRUCT 1,485 FEET OF 24-INCH TO 30-INCH STORM SEWER.
13592	N ROCK HILL 1015 STORM SEWER	Unfunded	Storm	CONSTRUCT 170 FEET OF 12-INCH STORM SEWER.
13882	HUDSON AVENUE 9745 STORM SEWER	Unfunded	Storm	CONSTRUCT APPROXIMATELY 100 LF OF 12 INCH STORM SEWER AND APPURTENANCES.
13885	DES PERES AVENUE 1104 CREEK BANK STABILIZATION	Unfunded	Storm	CONSTRUCT APPROXIMATELY 100 LINEAR FEET OF 10-FOOT HIGH RETAINING WALL.
13900	LITHIA AVE 341 CREEK BANK BANK STABILIZATION	Unfunded	Storm	CONSTRUCT 165 FEET OF 16 FOOT HIGH RETAINING WALL.
11206	BROOKHURST DRIVE STORM SEWER	Closed	Storm	CONSTRUCT 680 FEET OF 12-INCH TO 24-INCH STORM SEWER, 80 FEET OF 3 TO 4-FOOT HIGH MODULAR BLOCK WALL, 105 FEET OF VEGETATED SWALE, AND APPURTENANCES.
12863	MT. CALVARY BIORETENTION REHABILITATION	Closed	Storm	REHABILITATE THE BIORETENTION CELL AT MT. CALVARY LUTHERAN CHURCH AT 9321 LITZINGER ROAD.
10579	DES PERES - TWINBROOK STORM CHANNEL	(Closed	Storm	CONSTRUCTION OF APPROXIMATELY 890 FEET OF 12-INCH TO 21-INCH DIAMETER STORM SEWER AND APPURTENANCES.

APPENDIX B: COMMUNICATION





NOTICE OF VIRTUAL PUBLIC MEETING: **ROCK HILL STORMWATER MASTER PLAN**

The City of Rock Hill and Lochmueller Group will be holding a virtual public meeting to discuss recommended improvements in accordance with the Rock Hill Stormwater Master Plan (SWMP). The plan is aimed at identifying, prioritizing, and guiding project implementation strategies for stormwater related Capital Improvement Projects (CIPs) in the City of Rock Hill.

This meeting is going to be held over Zoom Webinar. You don't need to download or install anything to participate. You can join from a computer, tablet, smartphone, or landline, although joining from a computer, tablet, or smartphone is recommended to be able to view the presentation. For the link, go to: <https://www.rockhillmo.net/> or go to the link: <https://us06web.zoom.us/j/89212233384?pwd=YGrofmzkiSNjaW7nV7qo9J8CVCYeCr.1>. If you are unable to attend, a recording of the webinar will be available following the meeting on the City website.

At the meeting, a presentation will be given to explain the Stormwater Master Plan, and exhibits will be shown that illustrate the recommended improvements. This will be followed by a question-and-answer portion of the meeting. You will be able to submit questions via the Q&A function if you are joining on a computer or tablet. If you would like to submit questions prior to the meeting, to be answered during the meeting, please email amannion@lochgroup.com.

We would like to invite you to attend to learn about the recommended stormwater CIPs at the virtual public meetings on Wednesday, November 15th from 6:00 PM to 7:30 PM. This meeting will also be available to watch at City Hall for anyone who does not have internet access and wants to view the meeting. Requests for reasonable accommodations should be made by contacting Garrett Schlett, City Administrator, at 314-561-4302 or email at gschlett@rockhillmo.net.

VIRTUAL PUBLIC MEETING DATE

November 15, 2023 at 6 PM

If you have any questions about the public meeting, please call (314) 446-3794, or contact one of the following:

Allison Mannion, PE
Project Engineer
Lochmueller Group
411 N. 10th Street, Ste. 200
St. Louis, MO 63101
Email: amannion@lochgroup.com

Laura Mwirigi Rightler, PE, CFM
Project Manager
Lochmueller Group
411 N. 10th Street, Ste. 200
St. Louis, MO 63101
Email: rightler@lochgroup.com



February 7, 2023

NOTICE OF STORMWATER ASSESSMENT: FIELD WORK

The City of Rock Hill will be studying proposed improvements to the storm sewer and drainage issues in your area, to complete the Stormwater Master Plan (SWMP). The plan is aimed at identifying, prioritizing, and guiding project implementation strategies for stormwater related Capital Improvement Projects (CIPs) in the City of Rock Hill. The City of Rock Hill has contracted with Lochmueller Group to study and recommend the proposed improvements.

Representatives from Lochmueller Group will be in the area conducting interviews, collecting data and documenting stormwater issues. They may need to access private property including back yards and side yards. They will be wearing orange safety vests with the name “Lochmueller” on the back of them and will be collecting data and taking photos with a tablet computer mobile device (examples include iPad or cell phone).

A key part of a Stormwater Master Plan is public input. If you have knowledge of any stormwater issues in your area such as flooding or erosion, please contact one of the below representatives from Lochmueller Group:

Allison Mannion, PE
Project Engineer
Lochmueller Group
411 N. 10th Street, Ste. 200
St. Louis, MO 63101
Phone: (314) 446-3794
Email: amannion@lochgroup.com

Laura Mwirigi Rightler, PE, CFM
Project Manager
Lochmueller Group
411 N. 10th Street, Ste. 200
St. Louis, MO 63101
Email: rightler@lochgroup.com

To contact the City of Rock Hill, please call City Hall at 314-968-1410 and a member of staff will forward your request immediately.

Thank you for your cooperation as we work to improve the stormwater systems serving your neighborhood.

APPENDIX C: CALCULATIONS

Underground Storage for Old Warson Storm Sewer and Storage (P003)

Input Value				
Sub-Watershed Area (Acres)	Percent Impervious (%)	PI Factor (20 minutes 15year)	Inflow (q_i) (CFS)	Outflow(q_o) (CFS)
2.42	40	2.39	30.01	15.01

Result					
q_o/q_i	$V_s/V_r(*)$	Area (square mile)	Runoff V_r (acre-ft)	Detention Required (V_s) acre-ft	Detention Required (cubic feet)
0.5	0.19	0.004	0.49	0.09	4084.56

*Figure 6-1 from TR-55, Second edition, June 1986

Underground Storage for Remington Lane Stormwater Storage (P005)

Input Value				
Sub-Watershed Area (Acres)	Percent Impervious (%)	PI Factor (20 minutes 15year)	Inflow (q_i) (CFS)	Outflow(q_o) (CFS)
5.36553	40	2.39	13	6.41

Result					
q_o/q_i	$V_s/V_r(*)$	Area (square mile)	Runoff V_r (acre-ft)	Detention Required (V_s) acre-ft	Detention Required (cubic feet)
0.5	0.19	0.0086	1.094	0.2079	9056

*Figure 6-1 from TR-55, Second edition, June 1986

Rain Garden for Remington Lane Stormwater Storage (P005)

Input					
House Address	House Size (sqft)	Pitch	Fraction	Roof Area(sqft)	PI (20 minutes 100year)
2508 Remington Ln, Saint Louis, MO 63144	1268	3/5	1.118	1418	5.62
2516 Remington Ln. Saint Louis, MO 63144	1995	3/5	1.118	2230	5.62

Result		
Area(acre)	Flow(cfs)	Volume (cubic ft)
0.03	0.18	219
0.05	0.29	345

APPENDIX D: PROJECT EXHIBITS

Project # P001 Oday Ave Storm Sewer

Construct approximately 520 linear feet of 15-inch diameter storm sewer and appurtenances to capture flow from Oakleaf Dr and Oday Ave. The acquisition of two parcels will be required. This project will impact 21 properties and benefit 10 properties.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate

Project Name: Oday Ave Storm Sewer (From Oakhaven Ave to Sherrell Court)

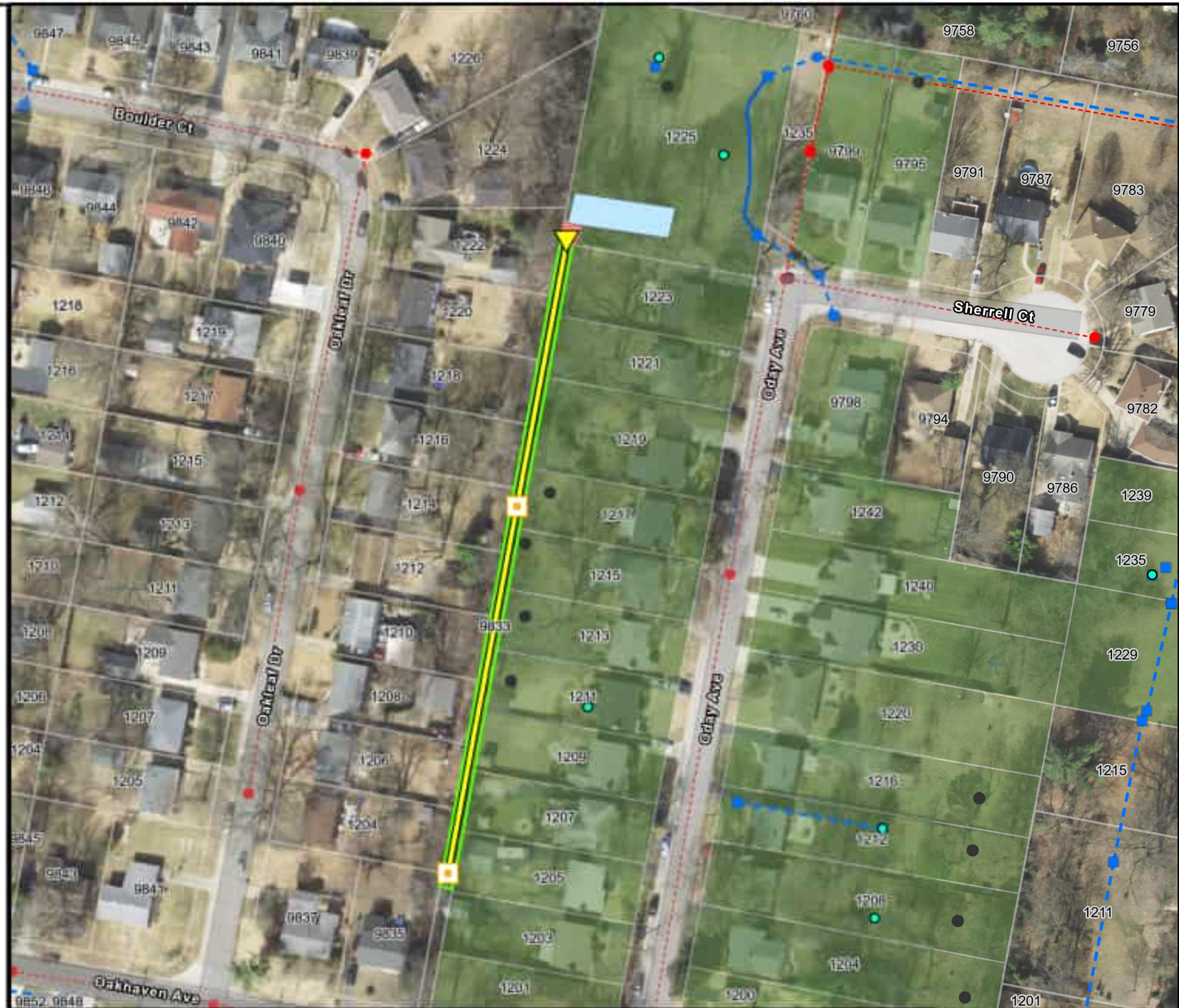
Project Number: P001

Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
41800000000000D	Inlet - Area	EA	\$3,206	2	\$6,412
4120002400000ST	Pipe Sewer 15" (storm)	LF	\$95	521	\$49,510
412000150000FE5	Flared Pipe End Section - 15"	EA	\$2,520	1	\$2,520
61300006003BOX	Excavation	CY	\$28	418	\$11,698
411300000000000	Sodding - Bluegrass	SY	\$13	592	\$7,692
61600000000000RUX	Rip Rap	SY	\$75	14	\$1,024
S4	Hybrid Basin	SF	\$125	2074	\$259,292
				Subtotal:	\$338,149
9D6b000000000000	Mobilization	LS	3.5%	1	\$11,835
9D40000000000000	Protection and Restoration	LS	14%	1	\$47,341
				Subtotal:	\$59,176
				Construction Costs:	\$397,325
	Engineering	LS	20%	1	\$79,465
	Easements and Land Acquisition	LS		1	\$200,000
	Contingency	LS	20%	1	\$135,358
				Total Costs:	\$812,000



Legend

- Sinkhole
- Exist Storm Sewer Inlet
- swIntake/Outfall
- Exist Storm Manhole
- Exist Storm Sewer
- Stormwater Channel
- ▼ Proposed Flared Pipe End
- Proposed Area Inlet
- Pipe Sewer 15 Inch (Storm)
- Sodding
- Hybrid Basin
- Rip Rap
- Exist Sanitary Sewer
- Exist Sanitary Manhole
- Problem Identification (PID)**
- Backyard Flooding
- Public Roadway Flooding
- Rock Hill Parcels**
- Parcel Surveyed
- Parcel



12/15/2023



0 50 100 200 Feet

Stormwater Master Plan
Project #: P001
Oday Ave Storm Sewer
Rock Hill, Missouri



411 N 10th Street, Suite 200
St. Louis, MO 63101

Project # P002

Fredric Ct Storm Sewer Extension

Construct one reach of 250 linear feet of 12-inch diameter storm sewer, one reach of 350 linear feet of 12-inch storm sewer, and appurtenances. No easements will be required. This project will impact eight properties and benefit eight properties.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate

Project Name: Fredric Ct Storm Sewer Extension (From Fredric Court to Rockwood Ave)

Project Number: P002

Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
4180000000000D	Inlet - Area	EA	\$3,206	2	\$6,412
4180000000000ST	Inlet - Street	EA	\$3,143	3	\$9,429
4120001200000ST	Pipe Sewer 12" (storm)	LF	\$84	595	\$49,980
4120001500000FES	Excavation	CY	\$28	406	\$11,368
61300006003HGX	Granular Backfill	CY	\$55	34	\$1,869
41130000000000	Sodding - Bluegrass	SY	\$13	891	\$11,583
9060000000000	Sidewalks & Driveways - Asphaltic Concrete Rem&Rep	SY	\$162	30	\$4,797
90600000000000	Sidewalks & Driveways - Concrete Rem&Rep	SY	\$100	20	\$2,049
90500000000000	Street Pavement - Concrete Rem&Rep	SY	\$80	81	\$6,480
Subtotal:					\$103,992
90600000000000	Mobilization	LS	3.5%	1	\$3,640
90400000000000	Protection and Restoration	LS	14%	1	\$14,559
Subtotal:					\$18,199
Construction Costs:					\$122,190
	Engineering	LS	20%	1	\$24,438
	Easements and Land Acquisition	LS		1	\$0
	Contingency	LS	20%	1	\$29,326
Total Costs:					\$176,000



Legend

- Sinkhole
- Exist Storm Inlet
- Exist Storm Manhole
- Exist Storm Sewer
- Proposed Area Inlet
- Proposed Street Inlet
- Pipe Sewer 12 Inch (Storm)
- Sidewalks & Driveways
- Sodding
- Street Pavement
- Existing Sanitary Sewer
- Exist Sanitary Manhole
- Problem Identification (PID)
- Backyard Flooding
- Main Structure Building Flooding
- Sink Holes
- Rock Hill Parcels
- Parcel Surveyed
- Parcel



Stormwater Master Plan Project #: P002 Fredric Ct Storm Sewer Extension Rock Hill, Missouri



411 N 10th Street, Suite 200
St. Louis, MO 63101

12/21/2023



0 50 100 200 Feet

Old Warson Storm Sewer and Storage

Construct approximately 930 linear feet of 15-inch diameter storm sewer and appurtenances. Install underground detention at Stroup Field. One easement will be required. This project will impact five properties and benefit five properties.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Old Warson Storm Sewer and Storage (From McKinley Ave to N Rock Hill Rd)					
Project Number: P003					
Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
418000000000ST	Inlet - Street	EA	\$3,143	4	\$12,572
41600000000000	Manhole - Standard Construction	EA	\$419	1	\$419
412000150000ST	Pipe Sewer 15" (storm)	LF	\$95	900	\$93,094
41340000000000BG	Sodding - Bluegrass	SY	\$13	488	\$6,344
51	Underground Detention	LS	\$35,000	1	\$35,000
9D400000000000	Street Pavement - Asphaltic Concrete Rem&Rep	SY	\$85	767	\$65,205
3H500000000000C	Excavation	CY	\$28	1240	\$34,939
41130000000000	Granular Backfill	CY	\$55	1790	\$98,445
				Subtotal:	\$346,823
	Mobilization	LS	3.5%	1	\$12,139
	Protection and Restoration	LS	14%	1	\$48,555
				Subtotal:	\$60,694
				Construction Costs:	\$407,517
	Engineering	LS	20%	1	\$81,503
	Easements and Land Acquisition	LS		1	\$0
	Contingency	LS	20%	1	\$97,804
				Total Costs:	\$587,000



- ### Legend
-  Proposed Manhole
 -  Proposed Street Inlet
 -  Pipe Sewer 15 Inch (Storm)
 -  Underground Detention
 -  Sodding
 -  Street Pavement
 -  Sinkhole
 -  Existing Storm Inlet
 -  Existing Storm Manhole
 -  Existing Storm Sewer
 -  Existing Sanitary Manhole
 -  Existing Sanitary Sewer
- ### Problem Identification (PID)
-  Backyard Flooding
 -  Public Roadway Flooding
- ### Rock Hill Parcels
-  Parcel Surveyed
 -  Parcel



12/15/2023



A scale bar with markings at 0, 50, 100, and 200 feet.

**Stormwater Master Plan
Project #: P003
Old Warson Storm Sewer and Storage
Rock Hill, Missouri**

Project # P004 Brownbert Ave Storm Sewer Extension

Construct approximately 200 linear feet of 18-inch diameter storm sewer and appurtenances. No easements will be required. This project will impact 4 properties and benefit 4 properties.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate

Project Name: Brownbert Ave Storm Sewer Extension

Project Number: P004

Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
41800000000005T	Inlet - Street	EA	\$3,143	2	\$6,286
416000000000000	Manhole - Standard Construction	EA	\$419	5	\$2,095
41200018000005T	Pipe Sewer 18" (storm)	LF	\$117	209	\$24,507
8H400000000000B	Sodding - Bluegrass	SY	\$13	55	\$719
9D5600000000000	Street Pavement - Concrete Rem&Rep	SY	\$80	35	\$2,812
9D4000000000000	Street Pavement - Asphaltic Concrete Rem&Rep	SY	\$85	111	\$9,467
3H500000000000C	Excavation	CY	\$28	175	\$4,910
411300000000000	Granular Backfill	CY	\$55	163	\$8,960
	Subtotal:				\$59,756
	Mobilization	LS	3.5%	1	\$2,091
	Protection and Restoration	LS	14%	1	\$8,366
	Subtotal:				\$10,457
	Construction Costs:				\$70,213
	Engineering	LS	20%	1	\$14,043
	Easements and Land Acquisition	LS		1	\$0
	Contingency	LS	20%	1	\$14,851
	Total Costs:				\$101,000



Legend

- Proposed Manhole
- Proposed Street Inlet
- Pipe Sewer 18 Inch (Storm)
- Sodding
- Street Pavement
- Exist Storm Inlet
- Exist Storm Intake/Outfall
- Exist Storm Manhole
- Exist Storm Sewer
- Exist Sanitary Manhole
- Exist Sanitary Sewer
- Problem Identification (PID)**
- Backyard Flooding
- Rock Hill Parcels**
- Parcel Surveyed
- Parcel



12/15/2023



0 50 100 Feet

Stormwater Master Plan
Project #: P004
Brownbert Ave Storm Sewer Extension
Rock Hill, Missouri

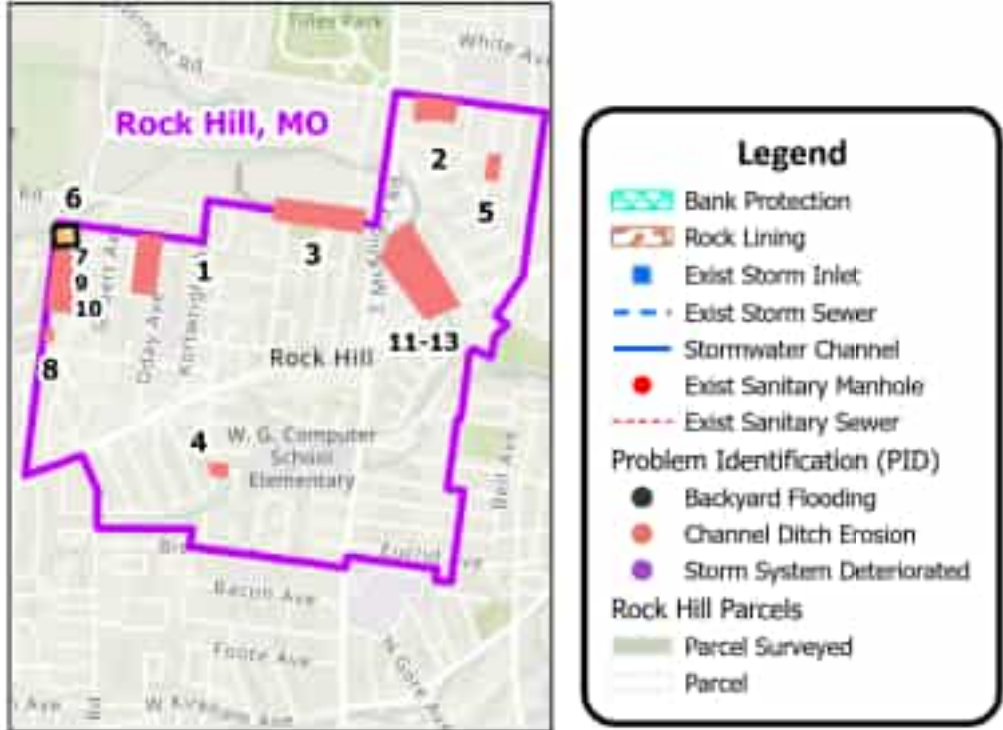


411 N 10th Street, Suite 200
St. Louis, MO 63101

Project # P006
North Des Peres Streambank Stabilization

Stabilize approximately 115 linear feet of creek bank. The one easement will be required. This project will impact one property and benefit one property.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: North Des Peres Streambank Stabilization					
Project Number: P006					
Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
6P5000000000BIOX	Bank Protection - Biostabilization	SY	\$60	75	\$4,500
6J6000000000RLX	Rock Lining	SY	\$78	77	\$5,991
3H150000000000C	Excavation	CY	\$28	1240	\$34,939
				Subtotal:	\$45,432
	Mobilization	LS	3.5%	1	\$1,590
	Protection and Restoration	LS	14%	1	\$6,368
				Subtotal:	\$7,951
				Construction Costs:	\$53,383
	Engineering	LS	20%	1	\$10,677
	Easements and Land Acquisition	LS		1	\$2,000
	Contingency	LS	20%	1	\$13,212
				Total Costs:	\$79,000



12/15/2023



Stormwater Master Plan
Project #: P006
North Des Peres Streambank Stabilization
Rock Hill, Missouri

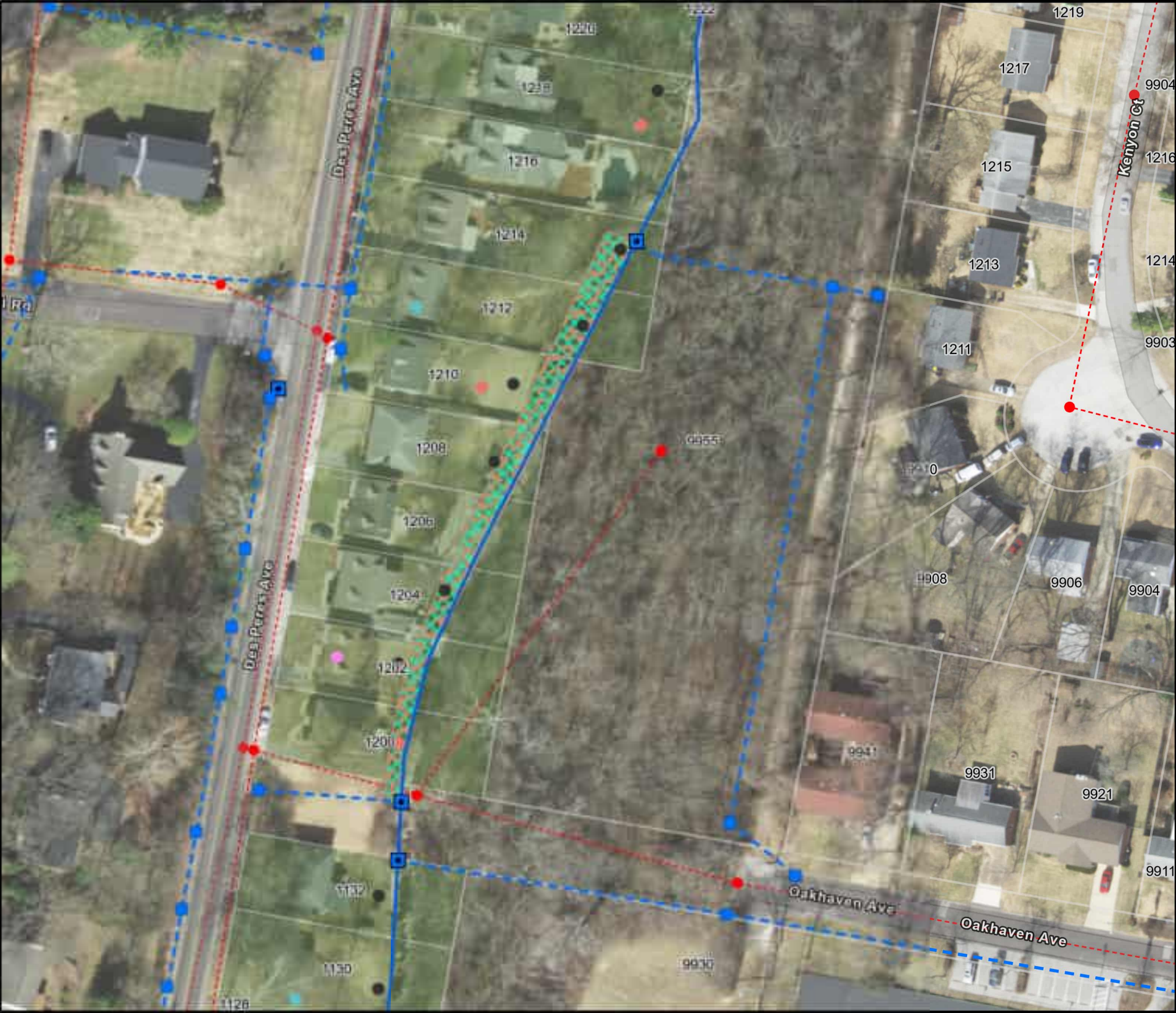


411 N 10th Street, Suite 200
St. Louis, MO 63101

Project # P007
Central Des Peres Streambank Stabilization

Stabilize approximately 500 linear feet of creek bank. Eight easements will be required. This project will impact eight properties and benefit eight properties.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Central Des Peres Streambank Stabilization					
Project Number: P007					
Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
6F5000000000BIOX	Bank Protection - Biostabilization	SY	\$60	730	\$43,800
6J0000000000RLX	Rock Lining	SY	\$78	730	\$56,940
3H500000000000C	Excavation	CY	\$28	572	\$16,022
				Subtotal:	\$116,762
	Mobilization	LS	3.5%	1	\$4,087
	Protection and Restoration	LS	14%	1	\$16,347
				Subtotal:	\$20,434
				Construction Costs:	\$137,196
	Engineering	LS	20%	1	\$27,440
	Easements and Land Acquisition	LS		1	\$16,000
	Contingency	LS	20%	1	\$36,128
				Total Costs:	\$217,000



12/15/2023



0 50 100 200 Feet

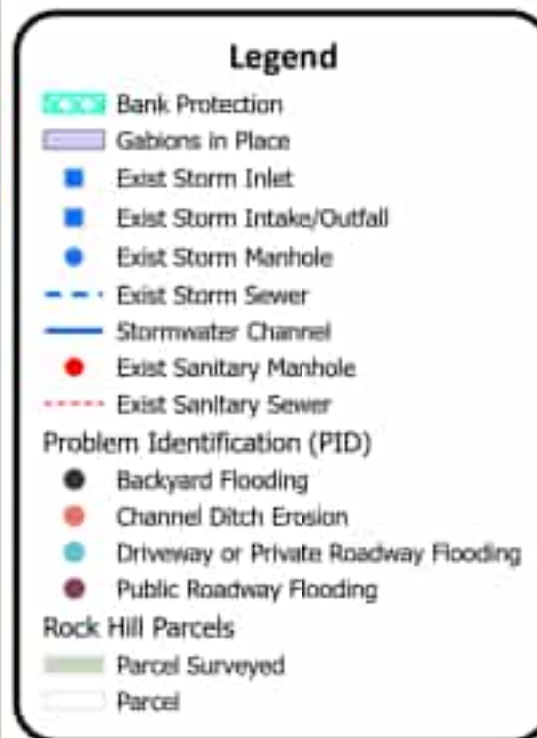
Stormwater Master Plan
Project #: P007
Central Des Peres Streambank Stabilization
Rock Hill, Missouri

LOCHMUELLER GROUP
411 N 10th Street, Suite 200
St. Louis, MO 63101

Project # P008

Add rock toe protection for 150 linear feet of creek with live staking. No acquisition of parcels will be required. This project will impact 1 property and benefit 1 property.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: South Des Peres Streambank Stabilization					
Project Number: P000					
Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
6F500000000000X	Bank Protection - Biontstabilization	SY	\$60	296	\$17,760
6J5000000000000	Gabions in Place	CY	\$200	123	\$24,660
3H500000000000C	Excavation	CY	\$28	99	\$2,764
				Subtotal:	\$45,191
	Mobilization	LS	3.5%	1	\$1,582
	Protection and Restoration	LS	14%	1	\$6,327
				Subtotal:	\$7,909
				Construction Costs:	\$53,099
	Engineering	LS	20%	1	\$10,620
	Easements and Land Acquisition	LS		1	\$0
	Contingency	LS	20%	1	\$12,744
				Total Costs:	\$76,000



12/15/2023



A horizontal scale bar with a black background and white markings. The markings are labeled 0, 25, 50, 100, and 150. The unit 'Feet' is written at the right end of the bar.

Stormwater Master Plan
Project #: P008 - South Des Peres Streambank Stabilization
Rock Hill, Missouri

Project # P009
Des Peres Buffer Zone Creation

Realign Warson Woods Creek to create a larger buffer zone between the creek and the houses. Utilize the open land at 9955 and 9930 Oak Haven Ave to shift the creek to the east. Two easements will be required. This project will impact 12 properties and benefit 12 properties.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Des Peres Buffer Zone Creation					
Project Number: P009					
Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
6F500000000B10X	Bank Protection - Bio-stabilization	SY	\$60	1007	\$60,414
6F600000000H1X	Rock Lining	SY	\$70	4898	\$342,814
3H50000000000C	Excavation	CY	\$28	2067	\$57,867
				Subtotal:	\$500,296
	Mobilization	LS	3.5%	1	\$17,510
	Protection and Restoration	LS	14%	1	\$70,041
				Subtotal:	\$87,552
				Construction Costs:	\$587,848
	Engineering	LS	20%	1	\$117,570
	Easements and Land Acquisition	LS		1	\$26,000
	Contingency	LS	20%	1	\$146,284
				Total Costs:	\$878,000



Legend

- Stream Realignment
- Bank Protection
- Rock Lining
- Exist Storm Inlet
- Exist Storm Intake/Outfall
- Exist Storm Manhole
- Exist Storm Sewer
- Stormwater Channel
- Exist Sanitary Manhole
- Exist Sanitary Sewer

Problem Identification (PID)

- Backyard Flooding
- Basement Backups
- Channel Ditch Erosion
- Driveway or Private Roadway Flooding
- Main Structure Building Flooding

Rock Hill Parcels

- Parcel Surveyed
- Parcel



12/15/2023



0 50 100 200 300 Feet

Stormwater Master Plan
Project #: P009
Des Peres Buffer Zone Creation
Rock Hill, Missouri



411 N 10th Street, Suite 200
St. Louis, MO 63101

Project # P010
Des Peres Ave Buy Out

FEMA Buy out of 1200, 1202, 1204, 1206, 1208, 1210 Des Peres Ave.
Acquisition of 6 parcels will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Des Peres Ave Buy Out					
Project Number: P010					
Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
	1200 Des Peres Ave*	LS	\$192,900	1	\$192,900
	1202 Des Peres Ave*	LS	\$235,800	1	\$235,800
	1204 Des Peres Ave*	LS	\$277,700	1	\$277,700
	1206 Des Peres Ave*	LS	\$233,500	1	\$233,500
	1208 Des Peres Ave*	LS	\$194,600	1	\$194,600
	1210 Des Peres Ave*	LS	\$287,200	1	\$287,200
	Contingency		20%	1	\$284,340
Total Costs:					\$1,706,000

*Property values based on St. Louis County revenue website in October 2023



Legend

- FEMA Buy Out
- Exist Storm Inlet
- Exist Storm Intake/Outfall
- Exist Storm Sewer
- Stormwater Channel
- Exist Sanitary Manhole
- Exist Sanitary Sewer
- Problem Identification (PID)
 - Backyard Flooding
 - Channel Ditch Erosion
 - Driveway or Private Roadway Flooding
 - Main Structure Building Flooding
- Rock Hill Parcels
 - Parcel Surveyed
 - Parcel



Project # P011
Industrial Court Streambank Stabilization
(S McKnight Rd to Manchester Rd)

Stabilize approximately 1,200 linear feet of creek bank. 6 easements will be required. This project will impact 6 properties and benefit 6 properties.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Industrial Court Streambank Stabilization					
Project Number: P011					
Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
6F500000000BIOX	Bank Protection - Bio-stabilization	SY	\$60	1007	\$60,414
6F600000000RLX	Rock Lining	SY	\$70	4898	\$342,814
3H500000000DOC	Excavation	CY	\$20	1111	\$31,111
				Subtotal:	\$473,541
	Mobilization	LS	3.5%	1	\$16,574
	Protection and Restoration	LS	14%	1	\$66,296
				Subtotal:	\$82,870
				Construction Costs:	\$556,410
	Engineering	LS	20%	1	\$111,282
	Easements and Land Acquisition	LS		1	\$26,000
	Contingency	LS	20%	1	\$138,738
				Total Costs:	\$832,000



Legend

- Bank Protection
- Rock Lining
- Exist Storm Inlet
- Exist Storm Intake/Outflow
- Exist Storm Manhole
- Exist Storm Sewer
- Stormwater Channel
- Exist Sanitary Manhole
- Exist Sanitary Sewer
- Problem Identification (PID)
 - Channel Ditch Erosion
 - Driveway or Private Roadway Flooding
 - Main Structure Building Flooding
- Rock Hill Parcels
 - Parcel Surveyed
 - Parcel



Project # P012
Industrial Court Floodproofing

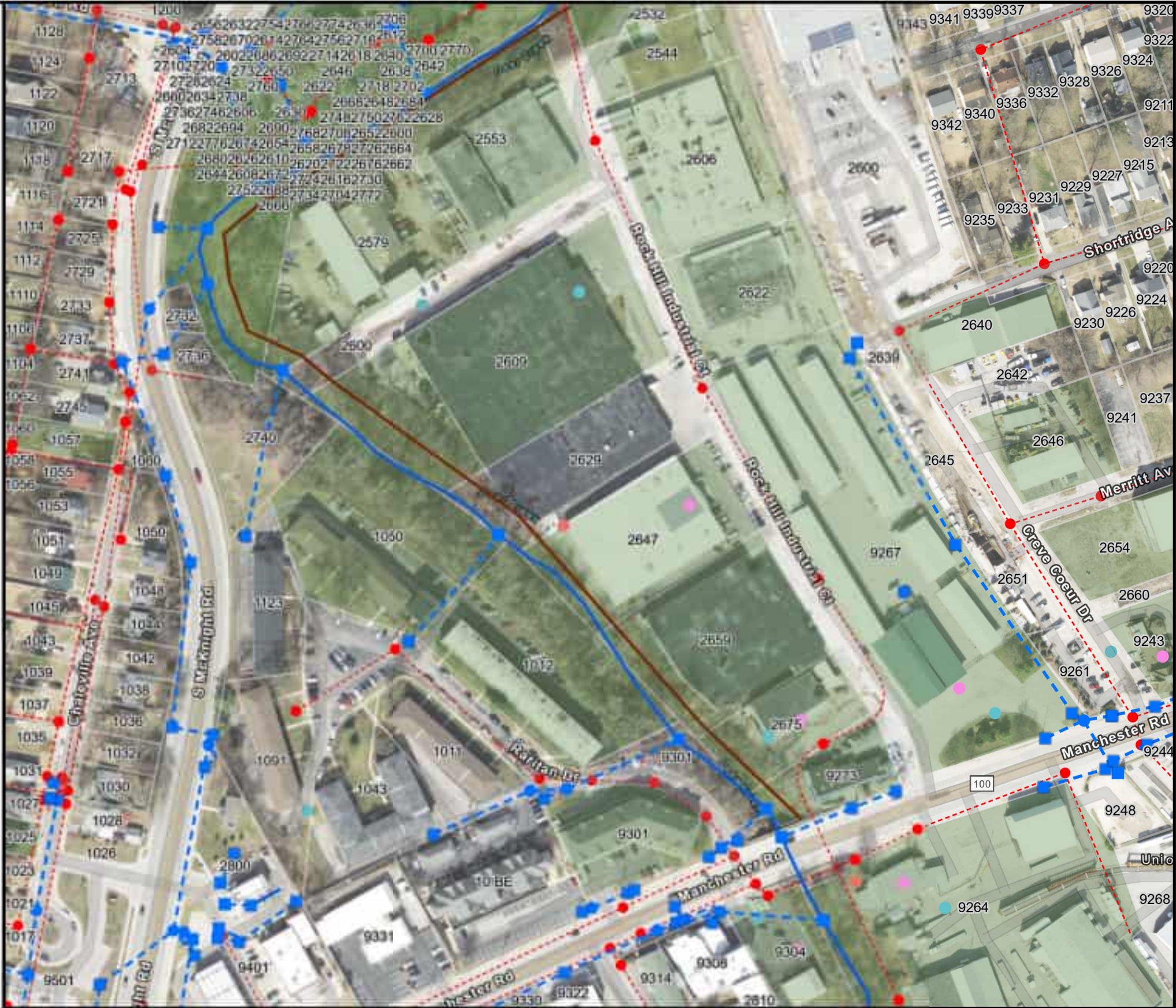
Construct approximately 1,800 LF of 8 foot high flood plank system passive flood proofing flood wall.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Industrial Court Floodproofing					
Project Number: P012					
Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
	Flood Planks	SF	\$200	14400	\$2,880,000
				Subtotal:	\$2,880,000
	Mobilization	LS	3.5%	1	\$100,800
	Protection and Restoration	LS	14%	1	\$403,200
				Subtotal:	\$504,000
				Construction Costs:	\$3,384,000
	Engineering	LS	20%	1	\$676,800
	Easements and Land Acquisition	LS		1	\$26,000
	Contingency	LS	20%	1	\$817,360
				Total Costs:	\$4,904,000



Legend

- Flood Wall
- Exist Storm Inlet
- Exist Storm Intake/Outflow
- Exist Storm Manhole
- Exist Storm Sewer
- Stormwater Channel
- Exist Sanitary Manhole
- Exist Sanitary Sewer
- Problem Identification (PID)
 - Channel Ditch Erosion
 - Driveway or Private Roadway Flooding
 - Main Structure Building Flooding
- Rock Hill Parcels
 - Parcel Surveyed
 - Parcel



12/19/2023



0 50 100 200 300 Feet

Stormwater Master Plan
Project #: P012 - Industrial Court Floodproofing
Rock Hill, Missouri

LOCHMUELLER GROUP
411 N 10th Street, Suite 200
St. Louis, MO 63101

Project # P013 Industrial Court Buy Out

FEMA buy out of 2579, 2553, 2609, 2629, 2647, 2659 and 2675
Rock Hill Industrial Ct and 9273 Manchester Rd. Acquisition of
8 parcels will be required. 8 properties will benefit from this project.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate

Project Name: Industrial Court Buy Out

Project Number: P013

Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
	2579 Rock Hill Industrial Ct*	LS	\$300,000	1	\$300,000
	2553 Rock Hill Industrial Ct*	LS	\$800,000	1	\$800,000
	2609 Rock Hill Industrial Ct*	LS	\$2,488,400	1	\$2,488,400
	2629 Rock Hill Industrial Ct*	LS	\$1,394,200	1	\$1,394,200
	2647 Rock Hill Industrial Ct*	LS	\$1,045,400	1	\$1,045,400
	2659 Rock Hill Industrial Ct*	LS	\$1,487,800	1	\$1,487,800
	2675 Rock Hill Industrial Ct*	LS	\$305,700	1	\$305,700
	9273 Manchester Rd*	LS	\$301,800	1	\$301,800
	Contingency	LS	20%	1	\$1,624,666
Total Costs:					\$9,748,000

*Property values based on St. Louis County revenue website in October 2023



Legend

- FEMA Buy Out
- Exist Sanitary Manhole
- Exist Sanitary Sewer
- Sinkhole
- Exist Storm Inlet
- Exist Storm Intake/Outfall
- Exist Storm Manhole
- Exist Storm Sewer
- Stormwater Channel

Problem Identification (PID)

- Channel Ditch Erosion
- Driveway or Private Roadway Flooding
- Main Structure Building Flooding

Rock Hill Parcels

- Parcel Surveyed
- Parcel



12/19/2023



0 50 100 200 300 Feet

Stormwater Master Plan Project #: P013 - Industrial Court Buy Out

LOCHMUELLER GROUP

411 N 10th Street, Suite 200
St. Louis, MO 63101

APPENDIX E: FEMA FUNDING INFORMATION

2022 State of Missouri Flood Damage Assessment Packet



Includes Information On:

Steps to Take Following a Flood
Substantial Damage “The 50% Rule”
FEMA Substantial Damage Estimator (SDE 3.0)
Damage Assessment Field Worksheets
Sample Notice
Sample Press Release
Sample Damage Determination Letters
Sample Right of Entry Forms
Sample Handouts for Residents
Information on Mitigation Programs
Information on Increased Cost of Compliance
Home Moving and Elevation Contractors



FOLLOWING A FLOOD

All local floodplain management ordinances in the State of Missouri require permits for the repair or reconstruction of flood damaged structures. The local floodplain administrator must ensure that the repair of a damaged structure within the community's Special Flood Hazard Area (SFHA) meets the requirements of the community's floodplain management ordinance.

Following a flood event, the local administrator should follow these five steps:

Step 1: Contact the Floodplain Section of the State Emergency Management Agency (SEMA) or the Federal Emergency Management Agency (FEMA). Both agencies have experience, materials, and guidance to assist in carrying out all floodplain management responsibilities. SEMA: (573) 526-9129 or FEMA: (816) 283-7063

Step 2: Identify those structures believed to be substantially damaged and begin doing damage assessments. Local officials should tour the flooded areas in the 1% chance floodplain and identify every structure which has been flooded, as well as those with obvious structural damage.

- Damaged buildings should be marked on a community map and photographed for future reference.
- Tag each structure with the notice included in this packet so residents are aware of the post-flood permit requirements. A sample press release is also included with this packet.

Damage assessments can be difficult. Local officials should inspect every flood-damaged building and calculate the cost of repairs. The FEMA Substantial Damage Estimator 3.0 software is available to help make these determinations. The pre-flood market value of every flooded structure can quickly be estimated from the County Assessor's records.

Step 3: Post information for the public about the local ordinance requirements for obtaining permits for repairs and rebuilding. Often repairs begin on flooded buildings before the water recedes from the structure. Therefore, it is very important that this step take place as soon as possible. History shows that information spreads quickly among flood victims. Posted signs, flyers, notices on damaged structures, press releases, and letters mailed to individual owners can all be used to augment this purpose. Become educated regarding the damage assessment process, reconstruction methods, and available mitigation programs. Have a "Floodplain Development Permit Application" in hand and ready to distribute. Keep it simple. Be prepared for residents who are angry that they cannot start immediate repairs.

Step 4: Provide technical information to residents on elevation and floodproofing techniques. Post-flood activities present the perfect window of opportunity to ensure that flood damages do not occur again. Federal or state mitigation programs are often available. The mitigation program experts at the Missouri State Emergency Management Agency can be contacted at: (573) 526-9116. Technical manuals and guidance are available. Public meetings can be presented in flooded communities to introduce flood victims to the various options available to them.

Step 5: Implement a permit application procedure. At this point the community should be on its way to enforcing the floodplain ordinance. Those structures identified as substantially damaged (cost to repair back to a pre-damaged condition is 50% or more of the pre-flood market value) should be "red-tagged". Permits should not be issued until compliance with the local floodplain ordinance is demonstrated. Those with less than 50% damage can be issued permits to repair.

SUBSTANTIAL DAMAGE

“THE 50% RULE”

Communities participating in the National Flood Insurance Program (NFIP) have adopted, and are expected to enforce, a floodplain management ordinance. New structures located in the 1% annual chance (100-year) floodplain must be elevated to or above the base flood elevation, depending upon the requirements of the community's floodplain management ordinance. The same flood protection and elevation regulations also apply to substantially damaged buildings.

SUBSTANTIAL DAMAGE. Whenever a building located in a mapped floodplain area - the Special Flood Hazard Area (SFHA) - is damaged from any source (flood, fire, seismic activity, wind, or human activity), the community must determine if that structure is substantially damaged. A building is substantially damaged when the cost of repairs is 50% or more of the structure's "pre-damaged" market value.

If the building is found to be substantially damaged, the structure must be brought into compliance with the community's floodplain ordinance, i.e. protected from future flooding to at least the base flood elevation, if it did not already meet this standard.

The cost of repairs must be calculated for full repair to "pre-damaged" condition, even if the owner elects to do less. The total cost of repair includes structural and finish materials as well as labor.

CUMULATIVE COST. If standards for CUMULATIVE IMPROVEMENT are adopted in a community's floodplain management ordinance, substantial damage occurs at the point where multiple damage or improvements total 50% or more of the pre-damage/pre-improvement market value of the building.

BUILDING VALUE. Building value is the market value of the structure only. Land and exterior improvements (pools, pool houses, landscaping, walkways, etc.) are excluded.

Following a disaster, most communities find that it expedites the process to obtain the structure's market value from the County Tax Assessor. This method of obtaining market value ensures consistency.

Other acceptable methods of estimating market value include:

- Independent appraisals by a Missouri professional appraiser.
- Detailed estimates of the structure's Actual Cash Value (replacement cost minus depreciation).
- Qualified estimates based on sound professional judgment made by the staff of the local building department.
- FEMA's Substantial Damage Estimator software

DETERMINATION OF EVENT DAMAGE – COST OF REPAIR. "Substantial Damage" refers to the repair of all damage sustained and CANNOT reflect a level of repairs that is LESS than the amount of the damage sustained. If the owner does not intend to repair the damaged building right away, or if the owner cannot afford to make all repairs immediately, the local official should inspect the property to determine whether, based on estimates, the work required to restore it to its pre-damaged condition constitutes Substantial Damage.

COSTS THAT MUST BE INCLUDED IN SUBSTANTIAL DAMAGE/SUBSTANTIAL IMPROVEMENT DETERMINATIONS:

- Materials and labor, including the estimated value of donated or discounted materials and owner or volunteer labor.
- Site preparation related to the improvement or repair (e.g., foundation excavation or filling in basements).
- Demolition and construction debris disposal related to removing structure walls, floors, etc. This should NOT include cleanup or disposal of contents.
- Labor and other costs associated with demolition, moving or altering of the structure to accommodate improvement, additions and making repairs.
- Costs associated with maintaining compliance with other codes or regulations, including the Americans with Disabilities Act (ADA).
- Costs associated with elevating a structure when the proposed elevation is lower than the BFE
- Construction management and supervision
- Contractor's overhead and profit
- Sales tax on materials

Structure Elements and exterior finishes, including:

- Foundations (e.g., spread or continuous foundation footings, perimeter walls, chain walls, pilings, columns, posts, etc.)
- Monolithic or other types of concrete slabs
- Bearing walls, tie beams, trusses
- Joists, beams, subflooring, framing, ceilings
- Interior non-bear walls
- Exterior finishes (e.g. brick, stucco, siding , painting, and trim)
- Windows and exterior doors
- Roofing, gutters and downspouts
- Hardware
- Attached decks and porches

Interior Finish Elements, including

- Floor finishes (e.g., hardwood, ceramic, vinyl, linoleum, stone, and wall-to-wall carpet over subflooring)
- Bathroom tiling and fixtures
- Wall finishes (e.g., drywall, paint, stucco, plaster, paneling, and marble)
- Built-in cabinets (e.g., kitchen, utility, entertainment, storage, and bathroom)
- Interior doors
- Interior finish carpentry
- Built-in bookcases and furniture
- Hardware
- Insulation

Utility and service equipment, including

- Heating, ventilation, and air conditioning (HVAC) equipment
- Plumbing fixtures and piping
- Electrical wiring, outlets, and switches
- Light fixtures and ceiling fans
- Security systems
- Built-in appliances
- Central vacuum systems
- Water filtration, conditioning, and recirculation systems

Guidance from Substantial Improvement/Substantial Damage Desk Reference – FEMA P-758, May, 2010, P. 4-5, 4-6, 4-7

COSTS THAT MAY BE EXCLUDED FROM SUBSTANTIAL DAMAGE/SUBSTANTIAL IMPROVEMENT DETERMINATIONS:

- Clean-up and trash removal; (e.g., cost of draining a basement, removing dirt and mud, and cleaning and drying out buildings)
- Costs to temporarily stabilize a building so that it is safe to enter to evaluate and identify required repairs
- Costs to obtain or prepare plans and specifications
- Land survey costs
- Permit fees and inspection fees
- Carpeting and re-carpeting installed over finished flooring such as wood or tile
- Outside improvements, including landscaping, irrigation, sidewalks, driveways, fences, yard lights, swimming pools, pool enclosures, and detached accessory structures (e.g., garages, sheds, and gazebos)
- Costs required for the minimum necessary work to correct existing violations of health, safety, and sanitary codes
- Plug-in appliances such as washing machines, dryers, and stoves.

Guidance from Substantial Improvement/Substantial Damage Desk Reference – FEMA P-758, May, 2010, P. 4-7



**FEMA Substantial Damage
Estimator (SDE 3.0)
SDE Cheat Sheet
Residential Field Worksheet
Non-Residential Field Worksheet
Long hand Field Worksheet**

Pages 7-18

FEMA SUBSTANTIAL DAMAGE ESTIMATOR (SDE 3.0)

THE FEMA SUBSTANTIAL DAMAGE ESTIMATOR (SDE 3.0)

The SDE 3.0 tool was developed by FEMA to assist State & local officials in determining substantial damage for residential & non-residential structures in accordance with local floodplain management ordinances meeting the regulatory requirements of the National Flood Insurance Program (NFIP). This tool can be used to assess flood, wind, wildfire, seismic, and other forms of damage. The SDE tool is based on the concept of using damage estimates for individual structural elements to determine whether the structure as a whole is substantially damaged. It allows community officials with limited appraisal or construction backgrounds to develop reasonable estimates of a structure's values and damage in accordance with NFIP requirements.

Communities with multiple flooding issues should obtain the SDE 3.0 software and Field Workbook and learn to use the program. Using the software will save time and research. SDE 3.0 software can be downloaded directly from the FEMA website:

<https://www.fema.gov/emergency-managers/risk-management/building-science/substantial-damage-estimator-tool>

The Installation Package Zip-file contains all of the items needed to load SDE 3.0. This Zip-file contains the manuals listed on the website download page and will also be downloaded in that package. This includes the Installation Guide which will provide answers to installation questions that have not been included in this packet. IT personnel should be contacted when having trouble installing the SDE software.

Please note that in the past the State Floodplain Management section downloaded and distributed the user's manual and all associated forms to the community. The SDE program size increased substantially during the recent updates, therefore providing paper copies of the manuals is no longer an option.

If you have any further questions or concerns, please contact Linda Olsen 573-526-9115 or linda.olsen@sema.dps.mo.gov.

INSTALLATION STEPS

Prior to installing the SDE 3.0 Tool, users are encouraged to export and save any existing SDE data from previous versions of the SDE tool. Although it is not required, FEMA recommends that users uninstall previous versions of the SDE tool from the host computer using the Windows Add/Remove Programs function to avoid confusion between past and current SDE inventories.

Installation steps may vary depending on the host computer setup and the utility program installed on the computer to unzip the SDE tool installation file downloaded from the FEMA website.

Use the following steps to install the SDE 3.0 Tool using a zip file downloaded from the FEMA website:

USER NOTE: A host computer can only have one installation of the SDE tool.

1. After opening the FEMA website (<http://www.fema.gov>), click on the Emergency Management tab, click on Building Science, then on the right hand side find Substantial Damage Estimator Tool or use the SDE web page found at <https://www.fema.gov/emergency-managers/risk-management/building-science/substantial-damage-estimator-tool> to locate the SDE tool download function.

2. Download the SDE installation zip file to the My Documents folder on the host computer and unzip the file. In many cases, users can unzip the folder by right-clicking on the file and selecting the option **Extract All ...** from the list of options or by double-clicking the zip folder and selecting the option **Extract all files** from the list of choices displayed. Some users may have an unzip utility installed that activates automatically when they select a zipped folder or file.

3. If the .NET Framework 4.6.1 is not already installed, the SDE installation routine will attempt to search online for the Framework and install it on the host computer during the SDE 3.0 installation. **Local administrative rights and an Internet connection are required to install the .Net Framework 4.6.1.** The user will need to accept the Framework license agreement (Figure 1) for the installation to continue.

4. After the SDE file has been extracted, open the folder and double click on the “Setup.exe” file to start the tool installation process. The Setup Wizard window shown in Figure 2 will appear.

5. Select **Next** button to continue the installation.

6. The Select Installation Folder window will appear next. This window allows the user to proceed with installation in the default location or change the destination folder. After the destination folder is identified, select **Next** to continue.

7. When the Confirm Installation window appears, the Setup Wizard is ready to proceed with the SDE installation on the host computer. Select **Next** to continue.

8. The installation status window will show the status of the installation process. When the status bar reaches 100%, select **Next** to continue.

9. Once the installation is complete, select Close to end the installation process.

10. Upon completion of the installation, an SDE icon will appear on the desktop of the host computer. Double-click the icon to run the SDE tool.

THE SDE “CHEAT SHEET”

The SDE requires the inspector to estimate the percent of damage for various building components. The information compiled below can be used with the SDE worksheet to quickly calculate substantial damage. It is intended to be used as a screening tool so that the property owner is notified as soon as possible as to the potential status of his property. Often a more detailed assessment is warranted and more detailed damage percentages should be determined on an as-needed basis.

- **Foundation** – *These numbers can be revised downward if the inspector is reasonably assured no damages have occurred.*
 - **Basement or crawlspace masonry foundations-**
 - 10% if minor hairline cracks and fractures or cosmetic (clean up, re-seal, paint, etc.)
 - 50% if cracked, bowed, or fractured on one or more walls
 - 100% if structural damage such as blow out or caved in walls
 - **Slab on Grade Foundations** –
 - 10% damage unless the foundation is undermined.
 - 30% if foundation is undermined
 - 75% if foundation is broken or bowed
 - **Joist and Pier Foundations**
 - 15% damage – for water depths exceeding height of floor
 - 100% damage where building has moved from foundation

This criteria is based on foundations that are substantially intact and do not include damages caused by subsidence or shifting of the foundation. In some cases hydrodynamic forces has caused an upheaval in slab on grade foundations. In this circumstance, individual assessment will be required.

- **Superstructure**
 - **Walls**
 - 10% for water depths of 2 feet or less
 - 25% for water depths of 2 to 4 feet
 - 75% for water depths of more than 4 feet
 - **Structural damage resulting from wind or impact damage**
 - Lineal feet of damage divided by total lineal feet of wall will equal percentage
 - **Roof damage**
 - Total square feet of roof damage divided by square footage of house will equal percentage
 - **Insulation and Weather-stripping**
 - 30% if waters less than 4 feet
 - 60% if waters greater than 4 feet but less than ceiling height
 - 100% if water above ceiling height
 - **Exterior Finish**
 - 30% if waters less than 4 feet
 - 60% if waters greater than 4 feet but less than ceiling height
 - 100% if water above ceiling height

These numbers are based on hydro dynamic forces acting on the exterior walls of the structure. Some brick or brick veneer structures may have actual damages less than those shown.

- **Interior Finish** - based on interior finishes susceptible to flood damage
 - 30% if waters less than 4 feet
 - 60% if waters greater than 4 feet but less than ceiling height
 - 100% if water above ceiling height
- **Doors, Windows and Shutters**
 - 50% if waters greater than 2 inches
 - 75% if waters greater than 4 feet
 - \$ 70.00 per individual window when other damage occurs
- **Lumber Finished**
 - 50% if water greater than 1 inch
 - 100 % if waters exceeding 4 feet
- **Hardware**
 - 100% if waters exceeding 4 feet
- **Cabinets and Countertops**
 - 20% if waters less than 3 inches
 - 70% if waters greater than 3 inches less than 4 feet
 - 100% if water exceeding 4 feet
- **Floor Coverings**
 - 100% if waters greater than 1 inch
 - 20% for ceramic tile, brick, or concrete floors
- **Plumbing**
 - 5% if waters less than 2 feet
 - 30% if waters between 2' and 4 feet
 - 50% if waters greater than 4 feet if the fixtures are not reused

Floodwater will rarely damage plumbing pipes so this schedule is based on the cost of plumbing fixtures and the labor to install them.

- **Electrical**
 - 10% if waters greater than 2 feet and less than 4 feet
 - 50% if waters greater than 4 feet and less than ceiling
 - 100% if waters greater than ceiling height

Some communities require the wiring to be replaced if they came in contact with flood waters. This schedule reflects replacement of fixtures and minimal wiring.

- **Built in Appliances**
 - 100% if waters more than 3 feet

- **Heating and cooling**
 - 30% if waters less than 3 feet
 - 60% if waters greater than 3 feet but less than ceiling height
 - *If A/C unit is located in the attic this number will be reduced to 30%*
 - 100% if waters greater than ceiling height
- **Painting**
 - 20% if waters less than 4 inches
 - 50% if waters less than 4 feet
 - 100% if waters greater than 4 feet

Reflects interior and exterior painting of the surfaces in contact with the water and areas where the surfaces are replaced due to damage. This category also includes finishing of doors and trim that may have been replaced.



Residential Field Worksheet

RESIDENTIAL/MANUFACTURED HOMES SDE DAMAGE INSPECTION WORKSHEET

Building Address

Owner First Name: _____ Owner Last Name: _____

Street Number: _____ Street Name: _____

City: _____ Zip Code: _____

Mailing Address **Check here if same as above:** _____ (IF KNOWN)

If different: Write mailing address here: _____
Have Right of Entry form returned Yes No
Initial here to give right to enter _____
Date permission given to enter _____

Additional Structure Information: (BEFORE DAMAGE OCCURRED) CHECK ONE in Each Category

Quality of Construction: (When first built) _____ Low _____ Average _____ Excellent

Resident type: _____ Single Family _____ Town or Row House _____ Manufactured House

Foundation: _____ Continuous Wall w/Slab (Standard) _____ Basement _____ Crawlspace _____

Piles _____ Slab-on-Grade _____ Piers and Posts

Superstructure: _____ Stud-Framed (Standard) _____ Common Brick _____ ICF _____ Masonry

Roof Covering: _____ Shingles – Asphalt (Standard) _____ Wood _____ Clay tile _____ Standing Seam (Metal)
_____ Slate

Exterior Finish: _____ Siding or Stucco (Standard) _____ Brick Veneer _____ EIFS
_____ Common brick, structural _____ None

HVAC System: _____ Heating and/or Cooling _____ NONE _____

Story: _____ One Story (Standard) _____ Two or More Stories

Depth of Flood Above ground: _____ (estimated to nearest foot) IF KNOWN

Depth of Flood Above First Floor (estimated to nearest foot) _____ IF KNOWN

No Physical Damage (Check here if none). _____

Duration of Flood: _____ Hours _____ Days

Date Damage Occurred (MM/DD/YYYY) _____

CAUSE of DAMAGE _____ Fire _____ Flood _____ Flood & Wind _____ Seismic _____ Wind

Has NFIP Insurance: _____ YES; _____ NO (IF KNOWN)

Has Photos: _____ Yes; _____ No How Many photos _____

Additional Structure Information: (NOTES) (Ex. Has brick fireplace. All wood floors)

Depreciation Rating: (Wear & Tear) 1. Requires Extensive Repairs, 2. Requires some Repairs, 3. Average Condition 4. Above Average Condition 5. Excellent Condition

NOTES:

<u>ELEMENT PERCENTAGES</u>	<u>% DAMAGED</u>
Foundation	_____
Superstructure	_____
Roof Covering	_____
Exterior Finish	_____
Interior Finish	_____
Doors & Windows	_____
Cabinets & Countertops	_____
Floor Finish	_____
Plumbing	_____
Electrical	_____
Appliances	_____
HVAC	_____
Skirting/Forms/Piers (MH only)	_____

Inspectors Name: _____ **Date of Inspection:** _____
MO/DD/YR

Inspectors Phone: _____

ANY NOTES: (No one sees this form but officials)

Non-Residential Field Worksheet

NON-RESIDENTIAL SDE DAMAGE INSPECTION WORKSHEET

Building Address _____

Owner First Name: _____ Owner Last Name: _____

Street Number: _____

City: _____ Zip Code: _____

Mailing Address **Check here if same as above:** _____

If different: Write mailing address here: _____
Have Right of Entry form returned Yes No
Initial here to give right to enter _____
Date permission given to enter _____

Year of Construction _____ Number of Stories _____, 1 Story _____, 2 thru 4 _____, 5 or More _____

Structure Use _____

Circle one: Foundation: _____ Continuous Wall w/Slab (Standard) _____ Basement _____ Crawlspace

Piles _____ Slab-on-Grade _____ Piers and Posts

Superstructure: _____ Stud-Framed (Standard) _____ Common Brick _____ ICF _____ Masonry

Roof Covering: _____ Shingles – Asphalt (Standard) _____ Wood _____ Clay tile _____ Standing Seam (Metal)
_____ Slate

Interior: _____

HVAC System: _____ Heating and/or Cooling _____ Where located? _____

Electrical _____

Plumbing _____

Depth of Flood above ground: _____ (estimated to nearest 0.5 foot)

Depth of Flood Above First Floor (estimated to nearest 0.5 foot) _____

No Physical Damage (Check here if none).

Duration of Flood: _____ Days: _____ Or Hours _____

Inspectors Name: _____ Date of Inspection: _____
(MM/DD/YYYY)

Latitude: _____ Longitude: _____

Quality of Construction: _____ Low _____ Budget _____ Average _____ Good _____ Excellent

Depreciation Rating: Check one:

_____ 1. Very Poor condition _____ 2. Requires Extensive Repairs _____ 3. Requires Some Repairs
_____ 4. Average Condition _____ 5. Above Average Condition _____ Excellent condition _____ 7. Other .

Depreciation Explanation (Write here).

ELEMENT PERCENTAGES	% DAMAGED
----------------------------	------------------

Foundation	_____
-------------------	-------

Superstructure	_____
-----------------------	-------

Roof Covering	_____
----------------------	-------

Plumbing	_____
-----------------	-------

Electrical	_____
-------------------	-------

Interiors	_____
------------------	-------

HVAC	_____
-------------	-------

NOTES:

SAMPLE STAND ALONE DAMAGE ASSESSMENT WORKSHEET (long hand version)

1. **Address:** _____

2. **Owner:** _____

Telephone Number _____

3. **Occupant:** _____

Telephone Number _____

4. **Insurance Coverage (Optional):**

Company _____ Policy Number: _____

Building: \$ _____ Contents: \$ _____

5. **Special Flood Hazard Area:**

Community I.D. #: _____

FIRM Panel: _____ FIRM Date: _____

Flood zone: _____ Base Flood Elevation _____

Existing Lowest Floor Elevation: _____ (if available)

6. **Duration of Flooding:** Days _____ Hours _____

7. **High Water Mark:**

A) Exterior Walls _____ ft.

B) Interior Walls _____ ft.

8. **Type of Structure:**

A) Exterior:

- | | |
|----------------------------|---------------------------|
| 1) Plywood/Hardboard _____ | 5) Brick _____ |
| 2) Stucco _____ | 6) Concrete Block _____ |
| 3) Siding/Shingles _____ | 7) Other (describe) _____ |
| 4) Masonry Veneer _____ | _____ |

B) Manufactured/Mobile Home:

- 1) Dimensions: a) single wide _____ size _____ x _____
b) double wide _____ size _____ x _____
- 2) Skirting: yes _____ no _____

9. Description of Structure:

- A) 1 story _____ 2 story _____ Tri-level _____
1 1/2 story _____ Bi-level _____ 3 or more _____
- B) Garage: attached _____ detached _____
Carport: attached _____ detached _____
- C) Roofing:
Metal/corrugated or ribbed _____ Composition shingles _____
Other: Describe _____
- D) Foundation:
Slab-on-grade _____
Crawlspace _____
Basement _____ (Finished __ Unfinished __)
Poured walls _____
Block walls _____
Post-piers-piles _____
- E) Heating and Cooling:
Forced air _____
Boiler _____
Wall furnace or baseboard _____
Heat Pump _____
Fireplace/wood burning stove _____
Other _____
- F) Plumbing: Number of bathrooms: _____
- G) Built-In Appliances:
List: _____

10. Description of Damage:

- A) Plumbing:
1) Is it exposed? _____
2) Does it need repair? _____
- B) HVAC/Electrical
1) Water depth _____ ft.
2) Damaged _____ (Repairable _____ Replaced _____)

Use corresponding numbers given below to answer C-F below:

- | | |
|-----------------------|--------------------------|
| 1. Settlement/cracked | 2. Partially missing |
| 3. Sagging | 4. Dislodged/destroyed |
| 5. Submerged | 6. Include all the above |
| 7. No damage | 8. Other: describe _____ |

C) Foundation _____

D) Exterior Walls _____

E) Interior Walls _____

F) Roof _____

11. Overall condition of structure:

- | | |
|----------------------------|-----------------------------------|
| A) Minor damage _____ | B) Major Damage _____ |
| C) Totally destroyed _____ | D) Structure off foundation _____ |

12. Determination of Substantial Damage

Percent Damage = $\frac{\text{Cost of Repair}}{\text{Market Value}}$ = _____

In the event that the percent damage is equal to or greater than 50%, the building is substantially damaged.

_____ This building is substantially damaged and therefore must be elevated or floodproofed so that the lowest floor is protected at or above the elevation of the base flood.

_____ This building is not substantially damaged. This building can be repaired without having to be mitigated.

_____ This is a properly elevated structure and may be reconstructed at its existing elevation.

Reviewed by: _____ Date: _____

Approved by: _____ Date: _____

SAMPLE LETTERS, FORMS AND NEWS RELEASES

Pages 20-25

⇒ NOTICE ⇐

Because this building is located in a floodplain and was damaged by flooding, a damage assessment must be conducted by the (city or county).

Before occupying this building or doing any repair work you must call the (city or county) community's Floodplain Administrator at (____) _____ to schedule an inspection.

Failure to obtain reconstruction approval may result in a penalty.

SAMPLE PRESS RELEASE

RESIDENTS IN (COMMUNITY) WITH FLOOD DAMAGE REMINDED OF PERMIT REQUIREMENTS

As property owners in (community) contemplate clean up and repairs following recent flooding, the (community permit office) is reminding residents to obtaining local permits before repairing or rebuilding flood-damaged structures.

The permits are required as part of local government participation in the National Flood Insurance Program, providing eligibility for flood insurance, flood disaster assistance, state and federal grants and loans, and buyout funds for flood-prone property.

Local floodplain management ordinances require that permits be obtained for any construction or development activity in a floodplain area, including the repair or reconstruction of structures damaged by flooding.

Special conditions apply to substantially damaged buildings - those in which the total cost of repairs is 50 percent or more of the structure's pre-flood market value. If a building is found to be substantially damaged, regulations require that repairs not begin until compliance with the local floodplain ordinance is demonstrated. In some cases, that may require repairs that include elevating or flood-proofing the structure to reduce the potential for future flood damage.

The cost to repair must be calculated for full repair to "pre-damaged" condition, even if the owner elects to do less. The total cost to repair includes structural and finish materials as well as labor. If labor and materials have been donated they must still be assigned a value. If local building codes require the structure to be repaired according to certain standards, these additional costs must be included in the full repair cost for the structure.

State and federal assistance may be available to property owners to reduce the chances of future flood damage. Mitigation assistance may cover costs of relocation, or for elevating or purchasing flood-damaged structures. Flood insurance may also provide up to \$30,000 to protect a structure from future flood damage.

Property owners and residents with flood-damaged buildings should contact (local building and zoning administrator) for more information on repair and reconstruction permits.

SAMPLE SUBSTANTIAL DAMAGE DETERMINATION LETTER

Community's Letterhead

Date

John & Jane Q. Public
1234 Flooded-By-The-River Road
Floodville, Mo 61000

RE: Substantial Damage Evaluation - 1234 Flooded-By-The-River Road

Dear Mr. and Mrs. Public,

Subsequent to the recent flooding event, a damage assessment has been completed on the property referenced above. This is a part of the **City of Floodville's** floodplain management responsibilities in order to maintain the availability of flood insurance and disaster assistance to residents. The following information relates to the address referenced above:

Community Name:	Floodville, Missouri
Flood Damage Timeframe:	June, 2022
Parcel Zone Information:	Zone AE
Total Damages:	\$65,000
Fair Market Value:	\$100,000
Percent Damaged:	65.0%

The determination is that this structure is declared **Substantially Damaged** and must be brought into compliance with the **City of Floodville's** Floodplain Ordinance prior to repair and reoccupation. For this structure to be in compliance with the ordinance, the structure must be elevated, moved outside the floodplain or demolished.

Building inspections, **Floodplain Development Permits**, and an **Elevation Certificate** will be required prior to occupancy. This structure may **NOT** be occupied until these corrections are made. Please contact this office at your earliest convenience to make an appointment to discuss your upcoming project.

If you have any additional questions, feel free to give me a call: xxx-xxx-xxxx.

Sincerely,

Floodplain Administrator
City of Floodville
Address:
Phone Number

SAMPLE NOT SUBSTANTIALLY DAMAGED DETERMINATION LETTER

Community's Letterhead

Date

John & Jane Q. Public
1234 Flooded-By-The-River Road
Floodville, Mo 61000

RE: Substantial Damage Evaluation - 1234 Flooded-By-The-River Road

Dear Mr. and Mrs. Public,

Subsequent to the recent flooding event, a damage assessment has been completed on the property referenced above. This is a part of the City of Floodville's floodplain management responsibilities in order to maintain the availability of flood insurance and disaster assistance to our residents. The following information relates to the address referenced above.

Community Name:	Floodville, Missouri
Flood Damage Timeframe:	June, 2022
Parcel Zone Information:	Zone AE
Total Damages:	\$35,000
Fair Market Value:	\$100,000
Percent Damaged:	35.0%

The determination is that this structure is declared: **Not Substantially Damaged**

An approved Floodplain Development Permit is required and it is attached. Please sign and date the permit and return it to my office. Be advised that we will make another determination if you elect to perform work other than what is necessary to repair the damage, such as additional renovations or upgrades or building an addition. **Construction activities that are undertaken without a proper permit are violations and may result in citations, fines or other legal action.**

If you have any additional questions, feel free to give me a call: xxx-xxx-xxxx.

Sincerely,

Floodplain Administrator
City of Floodville
Address:

SAMPLE RIGHT OF ENTRY FORM

**PROPERTY OWNER'S RIGHT OF ENTRY CERTIFICATION
AND RELEASE**

A floodplain permit is required for all construction activity in the Special Flood Hazard Area (SFHA) or that area inundated by the 1% annual chance of a flood, as designated by the National Flood Insurance Program (NFIP). These SFHAs are designated as A, AE, A1-A30, AH, or AO Zones on the Flood Insurance Rate Maps (FIRMs). This includes construction for new or improved residential and non-residential structures, filling, and excavation.

I, the undersigned, being the owner of the land and all structures located at **(address of the structure)**, Missouri, do hereby grant the community of **(community's name)** permission to inspect the property to determine the amount of damage and to comply with the National Flood Insurance (NFIP) Regulations for Substantial Damage Determinations according to Title 44 CFR, Section 60.3.

I, the undersigned, do hereby grant the community of **(community's name)**, its agents, servants, employees and assigns, for a period of 60 days or the completion of the substantial damage assessment, from the date of this document, permission to enter upon the above identified land to accomplish substantial damage/improvement determinations.

In consideration of the substantial damage assessment conferred on me by the community of **(community's name)**, in said substantial damage/improvement determinations, I, the undersigned, do hereby release and forever discharge the community of **(community's name)** its agents, servants, employees and assigns from any and all claims, demands, or actions for damages for any and all personal injuries, or loss or damage to property sustained in or growing out of said inspections, and from complications arising therefrom.

I also hereby agree to comply with the Community's Ordinance/Resolution No. _____.

It is understood that the above mentioned substantial damage assessment and the terms of the Release are fully understood and voluntarily accepted.

I HAVE READ THE FOREGOING RELEASE AND FULLY UNDERSTAND IT.

IN WITNESS WHEREOF, I have hereunder set my hand this ____ day of _____.

Signature

Witness

SAMPLE HANDOUT FOR RESIDENTS

Information Regarding Cleanup of Damaged Structures within the Floodplain

Repairs to damaged buildings located within the (**community's name**) floodplain require a Substantial Damage Assessment (SDE) and a permit from the (**community's name**) building department and/or the (**community's name**) Floodplain Administrator.

1. You **MUST** have a SDE determination and obtain a Floodplain Development Permit from (**community name**) before you repair, alter, or replace any of the following items:
 - a. Roof
 - b. Walls
 - c. Siding
 - d. Plaster
 - e. Cabinets
 - f. Flooring
 - g. Electrical systems
 - h. Plumbing
 - i. Heating
 - j. Air conditioning units
 - k. Foundation
2. You **MUST** obtain a Substantial Damage Assessment before you repair the above items. The permit office must conduct a damage assessment of the building. This inspection will determine if a structure is more than 50% damaged (substantially damaged). If a structure is found to be substantially damaged, the structure may not be repaired until compliance with the local floodplain ordinance is demonstrated. It is imperative that the community's Floodplain Administrator is contacted prior to taking any actions to repair damage related to the flood.
3. You may proceed with cleanup activities and temporary emergency repairs to prevent further deterioration, such as preventing the spread of mold and/or mildew, without a permit. These include:
 - a. Removing and disposing of damaged contents, carpeting, wallboard, and insulation.
 - b. Hosing and scrubbing, or cleaning floors, walls, and ductwork.
 - c. Covering holes in roofs or walls and covering windows to prevent the weather from inflicting further damage.
 - d. Removing sagging ceilings, shoring up broken foundations, and other actions to make the building safe to enter.

Prior to proceeding with cleanup activities that are allowed without a permit, thoroughly document the condition of the building by photographing the inside and outside of all areas that are being affected by the cleanup/emergency repairs.

NOTE: BUILDING REPAIRS AND STRUCTURAL IMPROVEMENTS ARE NOT ALLOWED WITHOUT A SDE DETERMINATION AND A PERMIT FROM THE LOCAL FLOODPLAIN ADMINISTRATOR.

Add Floodplain Administrator's name
Floodplain Administrator's Phone number

HMA GRANT INFORMATION

Pages 27 - 28

There are three potential grants under the Hazard Mitigation Assistance (HMA) program. Here is some basic information:

- **Hazard Mitigation Grant Program (HMGP)** provides funds after a disaster is declared in Missouri. This program assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration. The federal share is 75% and a local match share of 25% is required. The project must meet a 1.0 Benefit Cost Ratio using FEMA's Benefit Cost Analysis software program to be considered cost effective with exception of the 5% Initiative projects.
- **BRIC, Building Resilient Infrastructure & Communities, (Formerly PDM, Pre-Disaster Mitigation)** The application period opens each year. This is a new program and the Notice of Funding Opportunity (NOFO) usually rolls out in August and application development usually begins Sept. 30th or Oct. 1st. This grant provides a 75% federal share and requires a 25% local match share. If the community fits the definition of "small and impoverished", the federal share is 90% and only requires a 10% local match share. (See FEMA for definition for *small and impoverished*.) To be considered cost effective, the project must also meet a 1.0 Benefit Cost Ratio using FEMA's Benefit Cost Analysis software program.
- **Flood Mitigation Assistance (FMA)** is a nationally competitive grant that is funded by an annual appropriation by Congress. This is only for flood related projects with NFIP (National Flood Insurance Program) insured properties or the affected surrounding properties having NFIP Insurance. The application period opens each year, this information can be found on grants.gov. This grant provides 100% Federal if the properties are severe repetitive loss properties with repetitive loss strategy. In addition, there is a 90% Federal /10% local match share if the properties are repetitive loss.

Interested jurisdictions should submit a Notice of Interest (NOI) to SEMA to be considered for any of these grant programs. NOIs can be submitted at any time and are kept on file for two years. Depending on the specific program funding opportunity and when FEMA releases the Notification of Funding Opportunity (NOFO), NOIs are due to SEMA 30 business days after the NOFO announcement. This allows enough time for staff to conduct a thorough review, including an analysis of the cost benefit, Flood Insurance Rate Maps (FIRMs), budget, type of eligible project, and other necessary requirements. SEMA also will rate/score the NOIs based on certain criteria. This must occur before the jurisdiction is selected for application development, which is also dependent on budget and priorities.

The jurisdiction will be notified if their NOI has been selected for application development. For BRIC/FMA, jurisdictions must then submit their application utilizing FEMA's new grants management system (FEMA GO) before the SEMA due date provided at that time. For HMGP, SEMA will provide an application. SEMA and the jurisdiction will continue to coordinate during the application development process in order to submit all necessary documentation before FEMA's final deadline.

Here is a link to SEMA's Mitigation Management Webpage. NOIs and FEMA's HMA Guidance can be found here as well as a lot of other good information and resources.

https://sema.dps.mo.gov/programs/mitigation_management.php

There is also a link to subscribe to FEMA's notifications regarding BRIC and FMA.

[To subscribe to FEMA's notification system for grant funding opportunities, including Flood Mitigation Assistance \(FMA\), Building Resilient Infrastructure and Communities \(BRIC\) programs:](#)

<https://public.govdelivery.com/accounts/USDHSFEMA/subscriber/new>

Eligible Sub-applicants

An application **MUST** be submitted by an "eligible" city, county, special district, public school, university, or community college to be considered for funding. In some cases, counties or communities may apply for a mitigation grant on behalf of a private school (501 (c) 3 eligible), university, or two-year college. Due to various requirements, applications from individuals cannot be accepted; however, an eligible sub-applicant may apply for funding to mitigate private structures in cases of flood buyouts. SEMA only works with the local officials not individuals. SEMA does not fund tornado safe rooms for residential areas only community and school districts. All interested sub-applicants must apply to the Applicant (Missouri State Emergency Management Agency).

Table 1: Eligible Subapplicants

Entity	HMGP	BRIC	FMA	FMA
State agencies	✓	✓	✓	✓
Federally recognized tribes	✓	✓	✓	✓
Local governments/communities ⁽¹⁾	✓	✓	✓	✓
Private nonprofit organizations (PNPs)	✓			

Local governments/communities may include non-federally recognized tribes, or consistent with definition of local government at 44 CFR 201.2, may include any Indian tribe or authorized tribal organization, or Alaska Native village or organization that is not federally recognized per 25 U.S.C. 479a et seq.

Note1: There are no federally recognized Tribal Governments in Missouri at this time.

Note2: Not all private non-profit organizations qualify.



SEMA Mitigation Contacts:

- Heidi Carver, State Hazard Mitigation Officer (573) 526-9116
- Jennifer Storey, Deputy State Hazard Mitigation Officer (573) 526-9382

GENERAL NFIP INFORMATION

Page 30

Protect Your Home From Flood Damages

Under the National Flood Insurance Program (NFIP), the Increased Cost of Compliance (ICC) program may provide additional financial assistance to either elevate or remove flood damaged structures from the floodplain. The ICC applies to flooded structures that are either substantially damaged or located in a community with cumulative substantial damage provisions in its ordinance.

The two most common types of ICC mitigation used are:

Relocation:

Relocating structures to higher ground or purchasing flood prone property is the safest way to protect against flooding and reduce the liability and cost to the community. Relocation can be expensive, but in the long run it is not as costly as repetitive flood damages and high flood insurance premiums.

Elevation:

There are three methods used to elevate a structure:

Construction on crawlspace



Elevation on compacted fill



Elevation on post, piers, etc.



The elevation method is dependent on the structure's condition, flood hazard, local floodplain regulations, and owner's financial condition. When elevating, it is essential for all utilities (air conditioner, water heater, furnace, etc.) to be elevated to or above the Base Flood Elevation.

Owners who have standard flood insurance coverage have paid for and are eligible to receive ICC benefits if the local official determines that a structure located in a Special Flood Hazard Area has been substantially damaged by a flood or cumulatively damaged by flooding beyond 50% of the value of the structure when the damage occurred.

ICC does not normally cover buildings in B, C, X, or D Zones. However, if the community can document that it is regulating an area outside of the Special Flood Hazard Area (advisory or preliminary BFEs provided by FEMA), ICC will be available.

Home Moving and Elevation Contractors

The International Association of Structural Movers, founded in 1982, is a trade association representing structural movers in 12 countries. The Association's website, contains a listing of professional movers that are members of the association. You are encouraged to contact these companies first when you have a need for elevation, relocation or other type services.

www.iasm.org

APPENDIX F: BENEFIT/COST RATIO EVALUATION

MSD Benefit/Cost Analysis

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Oday Ave Storm Sewer (From Oakhaven Ave to Sherrell Ct) (P001)

DATE: 12/17/2023

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding							
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25		
		Basement (1 lot per structure) Address:	200		100		15		
		Attached Garage (1 lot per structure) Address:	100		50		8		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4		
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25		
		Yard Flooding (1 per lot) Address:	10		5		0		
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15		
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4		
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2		
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1		
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)							
		Habitable structures, residential (1 lot per structure) Address:	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots	
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	300		200		50		
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	150		100		25		
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	300		200		50		
		1.2.2. No. of lots (from 1.2.1) on outside of bend			lots	10 points per lot			
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Arterial Road: Address:	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots	
		Collector Road: Address:	75		50		12		
		Residential Road: Address:	35		25		6		
		Residential Road: Address:	20		12		3		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Oday Ave Storm Sewer (From Oakhaven Ave to Sherrell Ct) (P001)

DATE: 12/17/2023

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10	4	6		0		40	
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age	30						30			
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					70		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Oday Ave Storm Sewer (From Oakhaven Ave to Sherrell Ct) (P001)

DATE: 12/17/2023

CONTINUED:

SOLUTION BENEFIT CATEGORY						
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :		Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:		Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit		
	Bioswales		PER 100 LF	10		
	Forebays		AC	200		
	Wet Ponds		AC	100		
	Wetlands		AC	50		
	Biostabilization of banks (per bank)		PER 100 LF	10		
	Riffle Pool Complex		PER 100 LF	10		
	4.2. Eliminates combined sewer (per project)		EA	100		
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10		
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements	20				20
	5.2. Recreational/Educational	Yes = 100, no = 0 pts				
TOTAL SOLUTION POINTS						20
TOTAL BENEFIT POINTS						90

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

812

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

0.11

Place "X" in one box below:

☐

MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Fredric Ct Storm Sewer Extension (P002)

DATE: 12/18/2023

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
Notes: Problem points are awarded only for these problems:									
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding							
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25		
		Basement (1 lot per structure) Address:	200		100		15		
		Attached Garage (1 lot per structure) Address:	100		50		8		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4		
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25		
		Yard Flooding (1 per lot) Address:	10		5		0		
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15		
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4		
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2		
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1		
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)							
		Habitable structures, residential (1 lot per structure) Address:	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots	
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	300		200		50		
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	150		100		25		
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	300		200		50		
		1.2.2. No. of lots (from 1.2.1) on outside of bend			lots	10 points per lot			
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Arterial Road: Address:	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots	
		Collector Road: Address:	75		50		12		
		Residential Road: Address:	35		25		6		
		Residential Road: Address:	20		12		3		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Fredric Ct Storm Sewer Extension (P002)

DATE: 12/18/2023

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address: 9338 Frederic Ct	350		250	1	65		250	
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N						50	
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10	5	6		0		50	
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25	2	50			
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:		1	Points/pond:		5	5			
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age	30						30			
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					435		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Fredric Ct Storm Sewer Extension (P002)

DATE: 12/18/2023

CONTINUED:

SOLUTION BENEFIT CATEGORY						
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	0%	Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:		Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit		
	Bioswales		PER 100 LF	10		
	Forebays		AC	200		
	Wet Ponds		AC	100		
	Wetlands		AC	50		
	Biostabilization of banks (per bank)		PER 100 LF	10		
	Riffle Pool Complex		PER 100 LF	10		
	4.2. Eliminates combined sewer (per project)		EA	100		
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10		
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements	20				20
	5.2. Recreational/Educational	Yes = 100, no = 0 pts				
TOTAL SOLUTION POINTS						20
TOTAL BENEFIT POINTS						455

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

176

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

2.59

Place "X" in one box below:

☐

MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Old Warson Storm Sewer and Storage (P003)

DATE: 12/18/2023

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
Note: Problem points are awarded only for these problems:									
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding							
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25		
		Basement (1 lot per structure) Address:	200		100		15		
		Attached Garage (1 lot per structure) Address:	100		50		8		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4		
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25		
		Yard Flooding (1 per lot) Address:	10	1	5		0	10	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15		
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4		
		Traffic obstruction (> 6" of water) on collector street Address:	25		12		2		
		Traffic obstruction (> 6" of water) on residential street Address:	10		5	1	1	5	
	1.2. EROSION	1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Habitable structures, residential (1 lot per structure) Address:		300		200		50	
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:		150		100		25	
		Industrial, office, commercial and warehouse (1 lot per structure) Address:		300		200		50	
		1.2.2. No. of lots (from 1.2.1) on outside of bend			lots	10 points per lot			
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Arterial Road: Address:		75		50		12	
		Collector Road: Address:		35		25		6	
		Residential Road: Address:		20		12		3	

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Old Warson Storm Sewer and Storage (P003)

DATE: 12/18/2023

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10		6		0			
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age	30						30			
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					45		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Old Warson Storm Sewer and Storage (P003)

DATE: 12/18/2023

CONTINUED:

SOLUTION BENEFIT CATEGORY						
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	50%	Max points:	1000	500
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:		Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit		
	Bioswales		PER 100 LF	10		
	Forebays		AC	200		
	Wet Ponds		AC	100		
	Wetlands		AC	50		
	Biostabilization of banks (per bank)		PER 100 LF	10		
	Riffle Pool Complex		PER 100 LF	10		
	4.2. Eliminates combined sewer (per project)		EA	100		
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10		
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements	20				20
	5.2. Recreational/Educational	Yes = 100, no = 0 pts				
TOTAL SOLUTION POINTS						520
TOTAL BENEFIT POINTS						565

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

587

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

0.96

Place "X" in one box below:

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MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Brownbert Ave Storm Sewer Extension (P004)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
Note: Problem points are awarded only for these problems:									
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding							
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25		
		Basement (1 lot per structure) Address:	200		100		15		
		Attached Garage (1 lot per structure) Address:	100		50		8		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4		
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25		
		Yard Flooding (1 per lot) Address:	10		5		0		
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15		
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4		
		Traffic obstruction (> 6" of water) on collector street Address:	25		12		2		
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1		
	1.2. EROSION	1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Habitable structures, residential (1 lot per structure) Address:		300		200		50	
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:		150		100		25	
		Industrial, office, commercial and warehouse (1 lot per structure) Address:		300		200		50	
		1.2.2. No. of lots (from 1.2.1) on outside of bend			lots	10 points per lot			
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Arterial Road: Address:		75		50		12	
		Collector Road: Address:		35		25		6	
		Residential Road: Address:		20		12		3	

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Brownbert Ave Storm Sewer Extension (P004)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. <small>Note: Problem points are awarded only for those problems solved by the</small>	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10	4	6		0		40	
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age	30						30			
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					70		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Brownbert Ave Storm Sewer Extension (P004)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit			
	Bioswales		PER 100 LF	10			
	Forebays		AC	200			
	Wet Ponds		AC	100			
	Wetlands		AC	50			
	Biostabilization of banks (per bank)		PER 100 LF	10			
	Riffle Pool Complex		PER 100 LF	10			
	4.2. Eliminates combined sewer (per project)		EA	100			
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10			
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements	20				20	
	5.2. Recreational/Educational	Yes = 100, no = 0 pts					
TOTAL SOLUTION POINTS							20
TOTAL BENEFIT POINTS							90

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

101

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

0.89

Place "X" in one box below:

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MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Remington Lane Stormwater Storage (P005)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem categories awarded points for these problems:								
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding						
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25	
		Basement (1 lot per structure) Address:	200		100		15	
		Attached Garage (1 lot per structure) Address:	100		50		8	
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4	
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25	
		Yard Flooding (1 per lot) Address:	10		5		0	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)						
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15	
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4	
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2	
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1	
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)						
		Habitable structures, residential (1 lot per structure) Address:	Pts. for Ratio > 0.70 300	No. Lots	Pts. for Ratio 0.36 - 0.70 200	No. Lots	Pts. for Ratio 0.15- 0.35 50	No. Lots
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	150		100		25	
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	300		200		50	
		1.2.2. No. of lots (from 1.2.1) on outside of bend						
		10 points per lot						
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)						
		Arterial Road: Address:	Pts. for Ratio > 0.70 75	No. Lots	Pts. for Ratio 0.36 - 0.70 50	No. Lots	Pts. for Ratio 0.15- 0.35 12	No. Lots
		Collector Road: Address:	35		25		6	
Residential Road: Address:	20		12		3			

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Remington Lane Stormwater Storage (P005)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. <small>Note: Problem points are awarded only for those problems solved by the</small>	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10	2	6		0		20	
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age										
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					20		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Remington Lane Stormwater Storage (P005)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY						
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	50%	Max points:	1000	500
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:		Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit		
	Bioswales		PER 100 LF	10		
	Forebays		AC	200		
	Wet Ponds		AC	100		
	Wetlands		AC	50		
	Biostabilization of banks (per bank)		PER 100 LF	10		
	Riffle Pool Complex		PER 100 LF	10		
	4.2. Eliminates combined sewer (per project)		EA	100		
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10		
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements	20				20
	5.2. Recreational/Educational	Yes = 100, no = 0 pts				
TOTAL SOLUTION POINTS						520
TOTAL BENEFIT POINTS						540

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

176

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

3.07

Place "X" in one box below:

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MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: North Des Peres Streambank Stabilization (P006)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Notes: Problem solved categories awarded only for these problems:								
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding						
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25	
		Basement (1 lot per structure) Address:	200		100		15	
		Attached Garage (1 lot per structure) Address:	100		50		8	
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4	
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25	
		Yard Flooding (1 per lot) Address:	10		5		0	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)						
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15	
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4	
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2	
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1	
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Habitable structures, residential (1 lot per structure) Address:	300	1	200		50	300
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	150		100		25	
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	300		200		50	
		1.2.2. No. of lots (from 1.2.1) on outside of bend	1	lots	10 points per lot			10
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Arterial Road: Address:	75		50		12	
		Collector Road: Address:	35		25		6	
		Residential Road: Address:	20		12		3	

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: North Des Peres Streambank Stabilization (P006)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10		6		0			
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age										
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					310		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: North Des Peres Streambank Stabilization (P006)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit			
	Bioswales		PER 100 LF	10			
	Forebays		AC	200			
	Wet Ponds		AC	100			
	Wetlands		AC	50			
	Biostabilization of banks (per bank)	1	PER 100 LF	10		10	
	Riffle Pool Complex		PER 100 LF	10			
	4.2. Eliminates combined sewer (per project)		EA	100			
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10			
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)		>15 (0 pts)	
	Points for Easements	20					20
	5.2. Recreational/Educational	Yes = 100, no = 0 pts					
TOTAL SOLUTION POINTS							30
TOTAL BENEFIT POINTS							340

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

79

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

4.30

Place "X" in one box below:

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MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Central Des Peres Streambank Stabilization (P007)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for these problems:								
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding						
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25	
		Basement (1 lot per structure) Address:	200		100		15	
		Attached Garage (1 lot per structure) Address:	100		50		8	
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4	
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25	
		Yard Flooding (1 per lot) Address:	10		5		0	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)						
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15	
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4	
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2	
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1	
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Habitable structures, residential (1 lot per structure) Address:	300	2	200	1	50	5
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	150		100		25	
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	300		200		50	
		1.2.2. No. of lots (from 1.2.1) on outside of bend	9	lots	10 points per lot			90
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Arterial Road: Address:	75		50		12	
		Collector Road: Address:	35		25		6	
		Residential Road: Address:	20		12		3	

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Central Des Peres Streambank Stabilization (P007)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10		6		0			
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age										
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					1140		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Central Des Peres Streambank Stabilization (P007)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit			
	Bioswales		PER 100 LF	10			
	Forebays		AC	200			
	Wet Ponds		AC	100			
	Wetlands		AC	50			
	Biostabilization of banks (per bank)	5	PER 100 LF	10		50	
	Riffle Pool Complex		PER 100 LF	10			
	4.2. Eliminates combined sewer (per project)		EA	100			
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10			
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)		>15 (0 pts)	
	Points for Easements		10				10
	5.2. Recreational/Educational	Yes = 100, no = 0 pts					
TOTAL SOLUTION POINTS							60
TOTAL BENEFIT POINTS							1200

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

217

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

5.53

Place "X" in one box below:

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MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: South Des Peres Streambank Stabilization (P008)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
Note: Problem points are awarded only for these problems:									
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding							
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25		
		Basement (1 lot per structure) Address:	200		100		15		
		Attached Garage (1 lot per structure) Address:	100		50		8		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4		
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25		
		Yard Flooding (1 per lot) Address:	10		5		0		
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15		
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4		
	1.2. EROSION	1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)							
		Habitable structures, residential (1 lot per structure) Address: 1104 Des Peres Ave	300	1	200		50		300
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	150		100		25		
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	300		200		50		
		1.2.2. No. of lots (from 1.2.1) on outside of bend							
			1	lots	10 points per lot			10	
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Arterial Road: Address:	75		50		12		
		Collector Road: Address:	35		25		6		
		Residential Road: Address:	20		12		3		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: South Des Peres Streambank Stabilization (P008)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10		6		0			
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age										
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					310		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: South Des Peres Streambank Stabilization (P008)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit			
	Bioswales		PER 100 LF	10			
	Forebays		AC	200			
	Wet Ponds		AC	100			
	Wetlands		AC	50			
	Biostabilization of banks (per bank)	1	PER 100 LF	10		10	
	Riffle Pool Complex		PER 100 LF	10			
	4.2. Eliminates combined sewer (per project)		EA	100			
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10			
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements						
	5.2. Recreational/Educational	Yes = 100, no = 0 pts					
TOTAL SOLUTION POINTS							10
TOTAL BENEFIT POINTS							320

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

76

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

4.21

Place "X" in one box below:

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MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Des Peres Buffer Zone Creation (P009)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points		
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected			
Notes: Problem points are awarded only for these problems:										
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25			
		Basement (1 lot per structure) Address: 1202 Des Peres Ave	200		100	1	15		100	
		Attached Garage (1 lot per structure) Address:	100		50		8			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25	2	4		50	
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25			
		Yard Flooding (1 per lot) Address:	10	12	5		0		120	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)								
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15			
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4			
		Traffic obstruction (> 6" of water) on collector street Address:	25		12		2			
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1			
	1.2. EROSION	1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots	
		Habitable structures, residential (1 lot per structure) Address:		300	2	200	1	50	5	1050
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:		150		100		25		
		Industrial, office, commercial and warehouse (1 lot per structure) Address:		300		200		50		
		1.2.2. No. of lots (from 1.2.1) on outside of bend		12	lots	10 points per lot			120	
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots	
		Arterial Road: Address:		75		50		12		
		Collector Road: Address:		35		25		6		
		Residential Road: Address:		20		12		3		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Des Peres Buffer Zone Creation (P009)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10		6		0			
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age										
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					1440		

Note: Problem points are awarded only for those problems solved by the proposed solution.

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Des Peres Buffer Zone Creation (P009)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit			
	Bioswales		PER 100 LF	10			
	Forebays		AC	200			
	Wet Ponds		AC	100			
	Wetlands		AC	50			
	Biostabilization of banks (per bank)		PER 100 LF	10			
	Riffle Pool Complex		PER 100 LF	10			
	4.2. Eliminates combined sewer (per project)		EA	100			
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10			
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements						
	5.2. Recreational/Educational	Yes = 100, no = 0 pts					
TOTAL SOLUTION POINTS							
TOTAL BENEFIT POINTS							1440

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

878

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

1.64

Place "X" in one box below:

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MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Des Peres Ave Buy Out (P010)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points		
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected			
Note: Problem points are awarded only for these problems:										
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25			
		Basement (1 lot per structure) Address:	200		100	1	15		100	
		Attached Garage (1 lot per structure) Address:	100		50		8			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25	2	4		50	
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25			
		Yard Flooding (1 per lot) Address:	10	6	5		0		60	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)								
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15			
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4			
		Traffic obstruction (> 6" of water) on collector street Address:	25		12		2			
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1			
	1.2. EROSION	1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots	
		Habitable structures, residential (1 lot per structure) Address:		300		200		50		
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:		150		100		25		
		Industrial, office, commercial and warehouse (1 lot per structure) Address:		300		200		50		
		1.2.2. No. of lots (from 1.2.1) on outside of bend		6	lots	10 points per lot			60	
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots	
		Arterial Road: Address:		75		50		12		
		Collector Road: Address:		35		25		6		
		Residential Road: Address:		20		12		3		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Des Peres Ave Buy Out (P010)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. <small>Note: Problem points are awarded only for those problems solved by the</small>	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10		6		0			
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age										
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					270		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Des Peres Ave Buy Out (P010)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY						
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :		Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:		Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit		
	Bioswales		PER 100 LF	10		
	Forebays		AC	200		
	Wet Ponds		AC	100		
	Wetlands		AC	50		
	Biostabilization of banks (per bank)		PER 100 LF	10		
	Riffle Pool Complex		PER 100 LF	10		
	4.2. Eliminates combined sewer (per project)		EA	100		
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10		
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)	
	Points for Easements					
	5.2. Recreational/Educational	Yes = 100, no = 0 pts				
TOTAL SOLUTION POINTS						
TOTAL BENEFIT POINTS						270

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

1706

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

0.16

Place "X" in one box below:

☐

MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Industrial Court Streambank Stabilization (S McKnight Rd to Manchester Rd) (P011)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	
Note: Problem points are awarded only for these problems:								
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding						
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25	
		Basement (1 lot per structure) Address:	200		100		15	
		Attached Garage (1 lot per structure) Address:	100		50		8	
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4	
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150		25	
		Yard Flooding (1 per lot) Address:	10		5		0	
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)						
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15	
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4	
	1.2. EROSION	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2	
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1	
		1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Habitable structures, residential (1 lot per structure) Address:	300		200		50	
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	150		100		25	
		Industrial, office, commercial and warehouse (1 lot per structure) Address:	300	2	200	1	50	2
		1.2.2. No. of lots (from 1.2.1) on outside of bend	6	lots	10 points per lot			60
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)	Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Arterial Road: Address:	75		50		12	
		Collector Road: Address:	35		25		6	
		Residential Road: Address:	20		12		3	

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Industrial Court Streambank Stabilization (S McKnight Rd to Manchester Rd) (P011)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10		6		0			
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age										
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					960		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Industrial Court Streambank Stabilization (S McKnight Rd to Manchester Rd) (P011)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit			
	Bioswales		PER 100 LF	10			
	Forebays		AC	200			
	Wet Ponds		AC	100			
	Wetlands		AC	50			
	Biostabilization of banks (per bank)		PER 100 LF	10			
	Riffle Pool Complex		PER 100 LF	10			
	4.2. Eliminates combined sewer (per project)		EA	100			
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10			
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements		10			10	
	5.2. Recreational/Educational	Yes = 100, no = 0 pts					
TOTAL SOLUTION POINTS							10
TOTAL BENEFIT POINTS							970

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

832

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

1.17

Place "X" in one box below:

☐

MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Industrial Court Floodproofing (P012)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (<=2-Yr) Flooding		Frequent (>2<=15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
Note: Problem points are awarded only for these problems:									
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding							
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25		
		Basement (1 lot per structure) Address:	200		100		15		
		Attached Garage (1 lot per structure) Address:	100		50		8		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4		
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300		150	8	25	1200	
		Yard Flooding (1 per lot) Address:	10		5		0		
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15		
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4		
		Traffic obstruction (> 6" of water) on collector street Address:	25		12		2		
		Traffic obstruction (> 6" of water) on residential street Address:	10		5		1		
	1.2. EROSION	1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Habitable structures, residential (1 lot per structure) Address:		300		200		50	
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:		150		100		25	
		Industrial, office, commercial and warehouse (1 lot per structure) Address:		300		200		50	
		1.2.2. No. of lots (from 1.2.1) on outside of bend			lots	10 points per lot			
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Arterial Road: Address:		75		50		12	
		Collector Road: Address:		35		25		6	
		Residential Road: Address:		20		12		3	

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Industrial Court Floodproofing (P012)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. <small>Note: Problem points are awarded only for those problems solved by the</small>	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10		6		0			
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age										
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					1200		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Industrial Court Floodproofing (P012)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit			
	Bioswales		PER 100 LF	10			
	Forebays		AC	200			
	Wet Ponds		AC	100			
	Wetlands		AC	50			
	Biostabilization of banks (per bank)		PER 100 LF	10			
	Riffle Pool Complex		PER 100 LF	10			
	4.2. Eliminates combined sewer (per project)		EA	100			
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10			
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements						
	5.2. Recreational/Educational	Yes = 100, no = 0 pts					
TOTAL SOLUTION POINTS							
TOTAL BENEFIT POINTS							1200

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

4904

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

0.24

Place "X" in one box below:

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MSD Project

Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Industrial Court Buy Out (P013)

DATE: _____

PROBLEM SOLVED CATEGORY		Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
		Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
Notes: Problem points are awarded only for those problems									
1.0 STREAM	1.1. FLOODING	1.1.1. Structure Flooding							
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure) Address:	300		150		25		
		Basement (1 lot per structure) Address:	200		100		15		
		Attached Garage (1 lot per structure) Address:	100		50		8		
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		25		4		
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded) Address:	300	8	150		25	2400	
		Yard Flooding (1 per lot) Address:	10		5		0		
		1.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)							
		Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		100		15		
		Traffic obstruction (> 6" of water) on arterial street Address:	50		25		4		
	Traffic obstruction (> 6" of water) on collector street Address:	25		12		2			
	Traffic obstruction (> 6" of water) on residential street Address:	10		5		1			
	1.2. EROSION	1.2.1. Threatening Structure (Ratio=Height of bank / distance from structure)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Habitable structures, residential (1 lot per structure) Address:		300		200		50	
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:		150		100		25	
		Industrial, office, commercial and warehouse (1 lot per structure) Address:		300	2	200	1	50	2
		1.2.2. No. of lots (from 1.2.1) on outside of bend		6	lots	10 points per lot			60
		1.2.3. Threatening Roadway (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)		Pts. for Ratio > 0.70	No. Lots	Pts. for Ratio 0.36 - 0.70	No. Lots	Pts. for Ratio 0.15- 0.35	No. Lots
		Arterial Road: Address:		75		50		12	
		Collector Road: Address:		35		25		6	
		Residential Road: Address:		20		12		3	

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Industrial Court Buy Out (P013)

DATE: _____

CONTINUED:

2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	PROBLEM SOLVED CATEGORY, CONT. Note: Problem points are awarded only for those problems solved by the	Chronic (≤2-Yr) Flooding		Frequent (>2≤15-Yr) Flooding		Infrequent (>15-Yr) Flooding		Total Points	
			Points per Category	No. Lots Affected	Points per Category	No. Lots Affected	Points per Category	No. Lots Affected		
		2.1.1. Structure Flooding								
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* Address:	350		250		65			
		Basement (1 lot per structure)* Address:	250		200		50			
		Industrial, office, commercial and warehouse (1 lot per 2,500 sf of floor space flooded)* Address:	300		200		50			
		* If there is an existing public system and points are taken for any of the 3 items above, add 50 points.	Existing System Y/N							
		Attached Garage (1 lot per structure) Address:	100		75		25			
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) Address:	50		35		12			
		Yard Flooding (1 per lot) Address:	10		6		0			
2.1.2. Roadway Flooding (allocate 1 lot per 250' of roadway impacted & 2 lots per intersection impacted)										
Emergency Access restricted (>12" water over only access route to habitable structure), pts per structure Address:	200		150		25					
Traffic obstruction (> 6" of water) on arterial street Address:	50		35		6					
Traffic obstruction (> 6" of water) on collector street Address:	25		15		2					
Traffic obstruction (> 6" of water) on residential street Address:	10		6		1					
Ponding (per ponding area) Address:	No. Ponds:			Points/pond:		5				
2.2. Moderate Risk Erosion of misc. structures Address:	No. Lots:			Points/lot:		20				
2.3. Yard Erosion (1 per lot) Address:	No. Lots:			Points/lot:		10				
2.4. Age of Existing System	>50 yrs (30 pts)		26-50 yrs (15 pts)		<25 yrs (0 pts)					
Points for Age										
Note: Problem points are awarded only for those problems solved by the proposed solution.			TOTAL PROBLEM POINTS					3360		

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Industrial Court Buy Out (P013)

DATE: _____

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :			Max points:	1000	
	3.2. Combines smaller projects into regional solution (see note)	No. Add'l Projects:			Points per Add'l Proj.:	50	
4.0 ENVIRONMENTAL / WATER QUALITY	4.1. Addresses pollutants:	No. Units		Points per Unit			
	Bioswales		PER 100 LF	10			
	Forebays		AC	200			
	Wet Ponds		AC	100			
	Wetlands		AC	50			
	Biostabilization of banks (per bank)		PER 100 LF	10			
	Riffle Pool Complex		PER 100 LF	10			
	4.2. Eliminates combined sewer (per project)		EA	100			
	4.3. Eliminates inflow into sanitary system (1 each per basement flooded, yard vent overtopped, street inlet or driveway drain connected to sanitary/combined system, etc.)		EA	10			
5.0 MISC.	5.1. Ease of Implementation (No. of Easements)	0-5 (20 pts)	6-10 (10 pts)	11-15 (5 pts)	>15 (0 pts)		
	Points for Easements						
	5.2. Recreational/Educational	Yes = 100, no = 0 pts					
TOTAL SOLUTION POINTS							
TOTAL BENEFIT POINTS							3360

Note: A regional solution combines several smaller projects into a watershed or subwatershed solution.

TOTAL COST IN THOUSANDS=

9748

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS=

0.34

Place "X" in one box below:

☐

MSD Project

Project by Others

Priority Ranking

Benefit/Cost Ratio

Project Name: Oday Ave Storm Sewer (From Oakhaven Ave to Sherrell Ct)

Project Number: P001

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	1	100	100
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	2	500	1000
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	0	300	0
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	1100
Cost:	\$812,000
Benefit/Cost Ratio:	1.355

Benefit/Cost Ratio

Project Name: Fredric Ct Storm Sewer Extension

Project Number: P002

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	2	300	600
	Risk to garage	1	200	200
	Risk to driveway	0	100	0
	Risk to yard	3	100	300
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	2	500	1000
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	0	300	0
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	2100
Cost:	\$176,000
Benefit/Cost Ratio:	11.932

Benefit/Cost Ratio

Project Name: Old Warson Storm Sewer and Storage

Project Number: P003

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	2	100	200
	<u>Public Property</u>			
	Roadway	1	300	300

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	1	500	500
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	0	300	0
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	1000
Cost:	\$587,000
Benefit/Cost Ratio:	1.704

Benefit/Cost Ratio

Project Name: Brownbert Ave Storm Sewer Extension

Project Number: P004

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	1	100	100
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	1	500	500
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	0	300	0
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	600
Cost:	\$101,000
Benefit/Cost Ratio:	5.94

Benefit/Cost Ratio

Project Name: Remington Lane Stormwater Storage

Project Number: P005

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	1	100	100
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	1	500	500
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	0	300	0
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	600
Cost:	\$176,000
Benefit/Cost Ratio:	3.41

Benefit/Cost Ratio

Project Name: North Des Peres Streambank Stabilization

Project Number: P006

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	1	100	100
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	1	500	500
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	0	300	0
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	600
Cost:	\$79,000
Benefit/Cost Ratio:	7.59

Benefit/Cost Ratio

Project Name: Central Des Peres Streambank Stabilization

Project Number: P007

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	3	300	900
	Risk to garage	2	200	400
	Risk to driveway	0	100	0
	Risk to yard	3	100	300
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	1	200	200
	Risk to driveway	0	100	0
	Risk to yard	2	100	200
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	2	500	1000
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	1	300	300
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	3300
Cost:	\$217,000
Benefit/Cost Ratio:	15.21

Benefit/Cost Ratio

Project Name: South Des Peres Streambank Stabilization

Project Number: P008

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	1	200	200
	Risk to driveway	0	100	0
	Risk to yard	2	100	200
	<u>Public Property</u>			
	Roadway	2	300	600

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	1	300	300

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	1	500	500
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	1	300	300
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	2100
Cost:	\$76,000
Benefit/Cost Ratio:	27.63

Benefit/Cost Ratio

Project Name: Des Peres Buffer Zone Creation

Project Number: P009

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	3	300	900
	Risk to garage	2	200	400
	Risk to driveway	0	100	0
	Risk to yard	3	100	300
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	2	200	400
	Risk to driveway	0	100	0
	Risk to yard	2	100	200
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	3	500	1500
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	2	300	600
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	4300
Cost:	\$878,000
Benefit/Cost Ratio:	4.90

Benefit/Cost Ratio

Project Name: Des Peres Ave Buy Out

Project Number: P010

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to house	3	300	900
	Risk to garage	2	200	400
	Risk to driveway	0	100	0
	Risk to yard	3	100	300
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to house	0	300	0
	Risk to garage	1	200	200
	Risk to driveway	0	100	0
	Risk to yard	2	100	200
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	2	500	1000
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	1	300	300
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	0	200	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	3300
Cost:	\$1,706,000
Benefit/Cost Ratio:	1.93

Benefit/Cost Ratio

Project Name: Industrial Court Streambank Stabilization (S McKnight Rd to Manchester Rd)

Project Number: P011

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to building	3	300	900
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	3	300	900

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to building	2	300	600
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	3	500	1500
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	2	300	600
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	1	200	200

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	4700
Cost:	\$832,000
Benefit/Cost Ratio:	5.65

Benefit/Cost Ratio

Project Name: Industrial Court Floodproofing

Project Number: P012

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to building	3	300	900
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	3	300	900

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to building	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	2	500	1000
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	2	300	600
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	1	200	200

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	3600
Cost:	\$4,904,000
Benefit/Cost Ratio:	0.73

Benefit/Cost Ratio

Project Name: Industrial Court Buy Out

Project Number: P013

		Score	Weight	Total
Flooding	<u>Private Property</u>			
	Risk to building	3	300	900
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	3	300	900

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Erosion	<u>Private Property</u>			
	Risk to building	2	300	600
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	<u>Public Property</u>			
	Roadway	0	300	0

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Impacted Homeowners	Amount of homeowners who would benefit from project	3	500	1500
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Score: >12 Houses = 3, 5-11 Houses = 2, < 5 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	2	300	600
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	1	200	200

Score: High Risk = 3, Moderate Risk = 2, Low Risk = 1, No Risk = 0

Benefit Score:	4700
Cost:	\$9,748,000
Benefit/Cost Ratio:	0.48