CITY OF GLENDALE

424 N. Sappington Rd. Glendale, MO 63122

Stormwater Master Plan

December 26 2024 Rev 2: December 16, 2022

TABLE OF CONTENTS

TABLES

APPENDICES

1 EXECUTIVE SUMMARY

The City of Glendale 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 Glendale 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, fourteen projects were identify 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

As the City of Glendale 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 so informed decisions can be made for the greatest benefit to the areas experiencing stormwater runoff issues.

2.2 Purpose

By planning ahead and assessing stormwater runoff infrastructure improvements required to support current and future goals, the City of Glendale will be able to meet the 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 Glendale's current and future planning efforts. Infrastructure improvements must be aligned with land use patterns to sustain development. 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 Glendale. Information about stormwater drainage concerns were acquired from the Metropolitan St. Louis Sewer District (MSD), as well as from Glendale 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 436 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, there was public involvement in data collection. Letters were sent to all of the targeted properties (included in **Appendix C**). Lochmueller representatives went out during the time period of January 20th, 2022 to March 5th, 2022 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 home owners 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 being experienced. The photos are included in **Appendix D** and all photos and videos have been shared with the City of Glendale 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 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. Exhibit 4, Flooding Problems, Dominant Issue, shows the number of problems experienced in parts of the City. Both of these 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 Glendale, 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

Public meetings were held virtually, on May 25, 2022 and June 1, 2022 to share the findings of the field work and the recommended projects with the residents of Glendale. 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 and social media channels. A copy of the letter sent to residents can be found in **Appendix C**.

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 condition causing the problem
5. Projects that a property owner would not be able to complete themselves due to involving other properties or agencies

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 Glendale. Glendale had an estimated population of 6,176, based on the 2020 census data. The city is located south of Manchester Road, east of N Woodlawn Ave, north of W Lockwood Rd and west of N Rock Hill Rd. Glendale 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 Glendale's predominant soils types are Winfield-Urban land complex, Urban land-Harvester complex and Iva-Urban land complex. 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 Glendale are categorized primarily as "Group C" and "Group "D" soils.

A copy of the USDA NRCS soils map for the study area is included in **Appendix B** as Exhibit 6.

3.2.1.2 Karst Features

Karst features (include surface depressions, sinkholes, caves, fissures and karst springs) are present in the City of Glendale 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, a Warson Woods Creek feeder and Shady Grove Creek. The southern parts and some eastern parts of Glendale drain to Gravois Creek, which is primarily outside of the boundary of Glendale.

Each of these watersheds was divided up into subwatersheds to determine the drainage patterns and to calculate the flow.

3.2.3 Floodplains

The FIRM maps were reviewed for the planning area. No parts of Glendale are in the floodplain. Their FIRM maps are included in **Appendix B**.

3.3 Land Use, Population Trends and Projections

The land use of the City of Glendale is comprised primarily of residential land use, as well as a small amount of commercial land use which is primarily along Manchester Road.

Glendale 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 Glendale is unlikely. The City is bound on all sides by neighboring cities.

3.4 Infill Development

Glendale is completely developed, however one type of development that is ongoing throughout 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.

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 Glendale is made up of creeks, culverts, storm sewers and at least one sink hole. 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.

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 and property flooding are noted and have led to complaints from property owners. There are also areas in Glendale where stormwater collection facilities do not exist.

4.1.3 Adequacy of Current Facilities

The adequacy of current stormwater facilities in Glendale 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.

4.2 OMCI Stormwater Ordinance

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

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

Property Type	Amount
Residential	$0.0660
Agricultural	$0.0140
Commercial	$0.0810
Personal Property	$0.0930

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 E**.

5.1 Edwin Ave (From Sappington Rd to S Moreland Ave) (P001)

Near the intersection of Edwin Ave and S Moreland Ave, there are issues with the existing stormwater infrastructure overcharging. Homes along Edwin Ave have an open channel creek flowing through the backyard. This creek overflows creating dangerous flooding conditions in the backyards. The culvert across S Moreland Ave also floods over into the street.

The recommended solutions for these issues are to install underground storage upstream at City Hall, as well along S Moreland Ave. Adding a double inlet on the west side of S Moreland Ave at the low point in the street and roadway improvements are also recommended.

PHOTO 5.1 CREEK FLOODING IN BACKYARD OF 777 EDWIN AVE

5.1.1.1 Maps

A map that depicts this alternative can be found in **Appendix E.**

5.1.1.2 Easements

This project would require two easements and directly benefit eight properties.

5.1.1.3 General Estimate of Costs

Edwin Ave (From Sappington Rd to S Moreland Ave) (P001) has an opinion of probable cost of $**2,068,030**. A detailed cost estimate can be found on the exhibit in **Appendix E**.

5.2 Parkland, Elm and Algonquin Stormwater Storage (P002)

The neighborhoods of Cliff Side Ct, Algonquin Estates, the 200 block of Parkland Ave and the 200 block of Elm Ave experience severe flooding. These neighborhoods are all connected to one reach of creek and storm sewer. Upstream flooding issues are likely made worse by a lack of capacity downstream. At times there is water over the road and in the case of the lower Algonquin area, fast flowing water overtops the road creating hazardous conditions. At times cars are unable to drive on Parkland Ave due to the depth of the flooding. In addition to roadway flooding, several homes are experiencing main structure flooding, flooding of the driveway, backyards and garages.

PHOTO 5.2 FLOODING ALONG PARKLAND AVE. ROADWAY IS INACCESSIBLE. POLICE CRUISER STALLED AND WAS UNABLE TO DRIVE ON THIS ROAD. THE FRONT YARD AND DRIVEWAY OF THIS PROPERTY ARE COMPLETELY SUBMERGED. HOUSE STRUCTURE IS FLOODED.

The storm sewers in this area are undersized for the 15-year 20-minute design storm that MSD uses as a design capacity for their storm sewers. A solution to handle the excess stormwater that the system does not have capacity for is to add wet weather storage. Underground detention is proposed along Parkland Ave, Elm Ave and the "paper street" right-of-way (ROW) area between 6 Algonquin Estates Rd and 4 Algonquin Estates Rd.

5.2.1.1 Maps

A map that depicts this alternative can be found in **Appendix E.**

5.2.1.2 Land Requirements

This alternative will require one easement and will require a maintenance agreement between the City and MSD. This project will benefit 217 properties in this area.

5.2.1.3 General Estimate of Costs

Parkland, Elm and Algonquin Stormwater Storage (P002) has an opinion of probable cost of **$8,328,241**. A detailed opinion of probable cost can be found on the exhibit in **Appendix D**.

5.3 Willow Oak Diversion Sewer (P003)

A network of storm sewers ends at the downstream end at a sink hole between 15 Willow Oak Ln and 6 Kings Pond Rd. This sink hole is easily overwhelmed by the amount of stormwater from the storm sewer network as well as overland flow. The backyards of these houses quickly become flooded in large enough rain events.

PHOTO 5.3 FLOODED BACKYARD OF 15 WILLOW OAK DRIVE.

The water flows through the karst underground to 6 Devon Rd which is contributing to erosion of the channel at this location. This is discussed further in section 5.4.

It is recommended to remove some of this flow from going to the sink hole and divert the flow. Flow can be intercepted from the storm sewer on Willow Oak Ln and flow through 2,100 LF of 36-inch storm sewer east down Willow Oak Ln and then north along N Berry Rd. This storm sewer would be deep, so it is recommended to use a trenchless technology to construct this new storm sewer.

Another alternative to consider would be to direct this flow to the Algonquin Golf Course and detain the flow in a pond on the golf course. This would require coordination with the private golf course. This alternative should be considered during preliminary design.

Due to the depth of this storm sewer at the intersection of Willow Oak Ln and N Berry Rd, it is recommended that the design engineer consider pipe-in-tunnel installation. Traffic control around the bore pits along N Berry Rd are another construction consideration, as this is one of the busiest roads in the City.

5.3.1.1 Maps

A map that depicts this alternative can be found in **Appendix E.**

5.3.1.2 Land Requirements

This alternative will require no easements for the first alternative and one easement for the alternative to divert flow to the golf course.

5.3.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**5,640,730**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.4 Devon Rd Creek Stabilization (P004)

A channel starts in the front yard of 6 Devon Rd. The channel has, over time, eroded and gotten closer to the structure on the house.

PHOTO 5.4 EROSION OF CHANNEL AT 6 DEVON RD

A site visit was conducted by representatives from Lochmueller Group, Glendale and a geotechnical engineer on April 15, 2022. Water was flowing from underground to the creek. A rain even had not happened in over 24 hours. Water is likely traveling via an underground spring through the Karst.

A short- and long-term solution to this problem were discussed. A short-term solution would be to stabilize the creek bank with rip rap. A long-term solution would be to install Gabion Baskets along the creek bank.

5.4.1.1 Maps

A map that depicts this project can be found in **Appendix E.**

5.4.1.2 Land Requirements

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

5.4.1.3 General Estimate of Costs

The opinion of probable cost for the long-term solution is $**55,787**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.5 Idlewild Ln (From Hillard Rd to Dwyer Ave) Storm Sewer Relief (P005)

The intersection of Idlewild Ln, Hillard Rd and Dwyer Ave is flooded during rain events. The storm sewer between this intersection and the creek is undersized and needs additional capacity. It is recommended to remove and replace the existing 183 linear feet (LF) of 24-inch storm sewer with 30-inch storm sewer. A double inlet should also be added to the upstream portion of this reach of storm sewer along Hillard Road.

5.5.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.5.1.2 Land Requirements

This project would require the acquisition of two easements.

5.5.1.3 General Estimate of Costs

The opinion of probable cost is $**114,210**. A detailed opinion of probable can be found on the exhibit in **Appendix E**.

5.6 Juanita Ave Underground Storage (P006)

The storm sewer in area of Juanita Ave does not have sufficient capacity to collect and convey the stormwater in this area. The system downstream is undersized as well and replacing all of the storm sewer network in this area would be a very large and costly project and was therefore not considered as an alternative. Instead, underground storage along Juanita Ave is recommended. This will help attenuate flow in this area and also downstream.

PHOTO 5.5 STORMWATER FLOODING JUANITA AVE, AND RUNNING DOWN DRIVEWAYS

5.6.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.6.1.2 Land Requirements

This project will require no permanent easements, but a maintenance agreement between the City and MSD will be required. This project will benefit approximately 27 properties.

5.6.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**1,041,464**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.7 Brownell Ave Underground Storage (P007)

The storm sewer in area of Brownell Ave does not have sufficient capacity to collect and convey the stormwater in this area. The system downstream is undersized as well and replacing all of the storm sewer network in this area would be a very large and costly project and was therefore not considered as an alternative. Instead, underground storage along Brownell Ave is recommended. This will help attenuate flow in this area and downstream.

5.7.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.7.1.2 Land Requirements

This project will require no permanent easements, but a maintenance agreement between the City and MSD will be required. This project will benefit approximately 20 properties.

5.7.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**2,128,553**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.8 W Oak Drive Storm Sewer Relief (P008)

The storm sewer going behind houses along W Oak Dr is undersized. It is recommended to increase a 427 LF reach of the storm sewer that 36-inch to 42-inch so there is sufficient capacity. This project could also be done in in sequence with P006 and P007, which are both upstream of this location.

PHOTO 5.6 STORMWATER FLOWING INTO BACK YARD OF 715 W OAK DR FROM BROWNELL AVE. AREA INLET IS LOCATED IN THIS PHOTO BUT IS COMPLETELY SUBMERGED BY STORMWATER.

5.8.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.8.1.2 Land Requirements

This project will require seven easements and will benefit approximately 53 properties.

5.8.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**267,987**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.9 Alexandra Ave Storm Sewer (P009)

There are no storm sewers along N Sappington Rd between Glendale Elementary and Alexandra Ave. All of the stormwater in this area flows down Alexandra Ave to inlets in front of 815 Alexander Ave. In this area it is recommended to extend the storm sewer network so there are inlets to collect the water and storm sewers to convey the water along Alexandra Ave.

Inlets should be added at the corner of N Sappington Rd and Alexandra Avenue to collect the water flowing from N Sappington Rd. Inlets should also be added along Alexandra Ave to collect water along

PHOTO 5.7 STORMWATER FLOODING ALEXANDRA AVE, DUE TO OVERWHELMED INLETS.

Alexandra Ave so all of the water does not have to be collected at one point along the street, but instead can be collected at several points along the street.

5.9.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.9.1.2 Land Requirements

This project will require seven easements and will benefit approximately 53 properties.

5.9.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**487,885**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.10 Berrywood West Storage (P010)

Offline detention is recommended to help attenuate flow coming from the Glenbrook and Glenmoor areas. This network of storm sewers goes to Rockhill Creek along Frederick Ln and Flower Hill Ct, two areas north of this project area experiencing flooding from the creek that runs along both streets. This project along with Berrywood East Storage (P011) discussed in the next section are recommended to help attenuate some flow and help with the flooding along Frederick Lane.

The above ground storage is proposed to be located in a common ground owned by the Algonquin Ridge No 2 Trustees at 45 Berry Wood Dr A.

5.10.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.10.1.2 Land Requirements

This project will require four easements and will benefit approximately 65 properties.

5.10.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**272,518**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.11 Berrywood East Storage (P011)

Offline above ground storage is recommended to help attenuate flow coming from Berry Wood Dr and Flynn Forest Ln. This network of storm sewers goes to Rockhill Creek along Frederick Ln and Flower Hill Ct, two areas north of this project area that are experiencing flooding from the creek that runs along both streets. This project along with Berrywood West Storage (P010) discussed in the previous section are recommended to help attenuate some flow and help with the flooding along Frederick Ln. At least a few times a year, Frederick Ln becomes impassable due to the roadway being flooded. This project would benefit the area downstream of this project.

The above ground storage is proposed to be located in a common ground owned by the Algonquin Ridge No 2 Trustees at 30 Berry Wood Dr. This common ground has sufficient room for above ground storage to be located out of the way and out of view of the neighborhood.

PHOTO 5.8 FLOODED STREET ALONG FREDERICK LANE

5.11.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.11.1.2 Land Requirements

This project will require one easement and will benefit approximately 63 properties.

5.11.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**198,421**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.12 Glenmoor Lane Stormwater Improvements (P012)

Houses on the south side of Glenmoor Ln experience backyard flooding from Lisakay Dr. There is not a clear drainage path to storm sewer inlets. A swale or berm should be constructed in the backyards to help direct the stormwater to nearby inlets. 1044, 1056 and 1064 Glenmoor Ln are sloped to the east and the stormwater should be directed to an inlet to the east of these properties, located in the common ground at 45 Berry Wood Dr A. The property at 1032 Glenmoor Ln has already constructed a swale to direct the stormwater to the west. This swale should be continued along the rear of the properties at 1030 and 1026 Glenmoor Ln to direct the stormwater to the underground storage proposed at 1004 Glenmoor Ln.

The house at 1004 Glenmoor Ln is a low point on the street and experiences backyard, garage and driveway flooding. It is recommended to add underground storage in the backyard of 1004 Glenmoor Ln.

The storm sewer along and north of Glenmoor Ln has some sizing issues. The storm sewer is 30-inches in diameter across Glenmoor Ln and then goes to a 27-inch storm sewer. It is recommended to upsize 509 LF of 27-inch storm sewer to 30-inch storm sewer as well as add additional inlets, as a large amount of stormwater flows

from the street down the driveway of 1025 Glenmoor Ln and floods the backyards of several properties. The design engineer should confirm the sewer sizes during design.

Just downstream of this project is the recommended project Berrywood West Storage.

5.12.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.12.1.2 Land Requirements

This project will require 14 easements and will benefit approximately 21 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 E**.

5.13 Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd) (P013)

Houses along N Berry Rd experience backyard flooding despite the location of a storm sewer in the backyards. The storm sewer should be extended to the northwest corner of 1325 N Berry Rd to capture water that flows along the driveway and through the backyard of 1334 Monier Pl. The 18-inch storm sewer should be extended 62 LF. Some work might also need to be done in the backyards of 1301 and 1309 N Berry Rd to direct the stormwater more efficiently to the inlets such as a berm.

5.13.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E**

5.13.1.2 Land Requirements

This project will require two easement and will benefit approximately four properties.

5.13.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**71,443**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.14 Inlet & Curb Replacements (Brownell, Glenvista, Berry Oaks) (P014)

Several projects were combined into one project for Inlet Replacements (P014). Three smaller projects in different areas of the City were combined. The first inlet improvement ("A" on the exhibit) is on Brownell Ave, near 1230 and 1240 Brownell Ave. These two properties experience some flooding from the street. Initial calculations found that the storm sewer in this area had sufficient capacity, but that double inlets were needed based on the drainage area. Double inlets should be added to both the north and south side of the street.

The next area of needed inlet improvements ("B" on the exhibit) is along Glenvista Pl. The inlets along N Berry Rd are not sufficiently capturing the overland flow from the street. It is flowing down the driveways of 790 W Kirkham Ave and 797 Glenvista Pl and flooding the backyard of 789 Glenvista Pl and continuing down Glenvista Pl. It is recommended to build up curbs to help direct the stormwater to the inlets as well as to improve the storm sewers in this area and add an additional inlet.

The final inlet replacement is located at the intersection of Berry Oaks Dr and N Berry Rd. This intersection was repaved, and the inlets were not raised up to be in line with the new grade of the roadway. The inlets should be raised to operate optimally. The yard of 1201 N Berry Rd becomes flooded during rain events. Berry Oaks Dr drains to this back yard. A curb should be built up on the west side of 1201 N Berry Rd to help direct water to the inlet in the street, instead of into the yard of 1201 N Berry Rd.

5.14.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.14.1.2 Land Requirements

This project will require three easements and will benefit approximately 45 properties.

5.14.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**142,589**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.15 Glenhaven Storm Sewer Relief (P015)

The area along Berry Road Park, just to the south of Glenhaven Dr does not have any storm sewer infrastructure and a large portion of this neighborhood drains north between 6 Glenhaven Dr and 8 Glenhaven Dr. The property owners have attempted to install a private storm sewer between the two properties, but with the amount of water flowing to this area, a larger storm sewer is needed in this area. The 18-inch reach across Glenhaven Drive is recommended to be removed and replaced with a 27-inch storm sewer. A new 18-inch storm sewer is recommended to be constructed, running in front of 6 Glenhaven Dr before it heads south between 6 and 8 Glenhaven Dr with inlets added along the reach of sewer that runs between 6 and 8 Glenhaven Dr as well as replacing the inlets on either side of the street for the reach across Glenhaven Dr.

5.15.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.15.1.2 Land Requirements

This project will require two easements and will benefit approximately seven properties.

5.15.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**173,397**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.16 Glenbrook Stormwater Storage (P016)

The houses along Glenbrook Ave have had several stormwater issues over the past few years, with residents claiming it has gotten worse after the construction of the project west of Sappington, behind houses along Warwick Ln. The intersection of N Sappington Rd and Glenbrook Ave is at a low point along N Sappington Rd and water collects from N Sappington Rd from the North and from the South. Additional stormwater storage is something that would improve the issue of the storm sewers becoming inundated during rain events. Offline storage under the street along Glenbrook Ave or storage along the channel between Warwick Ln and Queen Anne Pl should both be evaluated as potential stormwater storage options.

5.16.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.16.1.2 Land Requirements

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

5.16.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**938,621**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.17 Clif Side Dr Storm Sewer (P017)

MSD developed a project to address flooding at 431 Clif Side Dr. The culvert that connects Shady Grove Creek across Elmwood Ave is undersized to convey the 15-year 20-minute rain event. This is causing water to overtop the banks and flow into the property at 431 Clif Side Dr. The project developed by MSD involved constructing a second culvert next to the existing culvert. The existing culvert is a 54-inch pipe and MSD recommends constructing a 60-inch culvert parallel to this. This would allow the existing culvert to remain in use while the new adjacent culvert is constructed. After preliminary hydraulic modeling it was found that a new 60-inch culvert would not alleviate the flooding of the property at the crossing.

PHOTO 5.9 EXISTING 54 INCH CULVERT ACROSS ELMWOOD AVE

To reduce the tailwater at the crossing to an acceptable level, a 14-foot by 4-foot box culvert is recommended. This size box culvert will reduce the headwater of the crossing so that it will be below the property's basement floor elevation with at least a foot of freeboard and will provide adequate cover over the culvert. Flooding will still occur on the property to an extent during the 15-year 20-minute design storm but will be limited to backyard areas. The culvert profile and tributary drainage areas can be found in **Appendix E.**

The existing concrete swale and headwall will have to be widened at the entrance of the culvert to accommodate the additional width.

5.17.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.17.1.2 Land Requirements

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

5.17.1.3 General Estimate of Costs

The opinion of probable cost for this project is $**539,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.18 Glenway Dr Storm Sewer Improvements (P018)

There is an existing 72-inch by 72-inch box culvert located in the back yards of the houses along the east side of Glenway Dr, south of Glen Elm Dr, between 1062 and 1122 Glenway Drive. At 1122 Glenway Drive, the box culvert discharges into a reinforced concrete channel. Just upstream of the 72-inch by 72-inch box culvert is a reinforced concrete channel that flows into a 96-inch by 48-inch box culvert between 1031 and 955 Glenway Drive.

During high intensity rain events, the overland flow is unable to enter the culvert and runs along the overland flow path on the surface. This results in rapidly moving water through the backyards of houses on the east side of Glenway Drive and over Warwick Ln.

PHOTO 5.10 OVERLAND FLOW BEYOND EXTENTS OF REINFORCED CONCRETE CHANNEL AT 1122 GLENWAY DR

A hydrologic evaluation was performed using MSD's Stormwater Design Criteria calculations, which determined the 72-inch by 72-inch concrete box is sufficient to convey the 15-year 20-minute flow, however, the 96-inch by 48-inch concrete box upstream of this is undersized to convey the 15-year 20-minute flow. If this pipe is surcharged, this might be a cause of this issue, requiring part of the flow to go along the overland flow path above grade. The 96-inch by 48-inch concrete box should be replaced with a 72-inch by 72-inch concrete box.

The inlets along Glenway Dr near 1047 Glenway Dr are single inlets. Using MSD's Inlet and Gutter Capacity Chart, these should be replaced with double inlets to capture the overland flow sufficiently. This solution would not result in a solution to this existing problem, but would help in making sure the overland flow is sufficiently getting captured in the system.

Going further upstream and downstream in this storm sewer network, there are issues in many parts of Glendale and neighboring cities. The best solution would be a series of storage, either underground or above ground storage tanks, in Glendale and Ladue. There are currently two underground storage projects recommended within the City further upstream in the system, Brownell Ave Underground Storage (#P007) and Juanita Ave Underground Storage (#P006). These, along with additional storage could help reduce the overland flow issue in this area by attenuating flow upstream in the system. This would require coordination with the City of Ladue, as over half of the flow in the Warson Woods Feeder watershed is coming from Ladue.

5.18.1.1 Maps

An exhibit that depicts this project can be found in **Appendix E.**

5.18.1.2 Land Requirements

This project would require three easements and will benefit approximately twelve properties.

5.18.1.3 General Estimate of Costs

The opinion of probable cost for the total project is $**573,000**. A detailed opinion of probable cost can be found on the exhibit in **Appendix E**.

5.19 Non-Capital Projects

Consideration should also be given to projects that are not capital improvement projects. This includes the completion of a risk assessment/flood mapping. Currently the City does not meet the minimum requirements to trigger FEMA flood mapping be completed. However, it is recommended for the City to complete a risk

assessment to identify vulnerable areas in the City. This would allow residents to measure the risk in high-risk areas, and possibly purchase flood insurance. It would be more proactive to identify high risk areas in the City with a risk assessment, than reacting to a flood occurring.

It is also recommended to complete a stormwater ordinance. From conversations with homeowners and observations in the field, there is some infill development occurring in the City. Several homeowners had complaints about neighbors building newer, larger houses where previously smaller footprint houses were located, or adding additions on to the existing house structure, creating more impervious area in the City. This is leading to worsening stormwater problems.

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 would be to keep inlets free and clear of debris and educating homeowners to help the City keep inlets free and clear of debris.

5.20 Resiliency

A concern in the City of Glendale is accessibility of public roadways during rain events. With the existing conditions, some roads such as Parkland Ave, Algonquin Estates, Alexandra Ave, Juanita Ave and others become inaccessible at times. This is a concern as emergency vehicles need to be able to access all parts of the City, even during rain events. In August of 2019, the stormwater was so deep along Parkland Ave that a police cruiser stalled and was unable to continue down the road. Flooded roadways will increase response times for emergency vehicles and is a safety concern.

In addition to emergency vehicles, other vehicles such as school buses need to be able to access all areas of the City.

5.21 Design Criteria

Storm sewers designed for installation in MSD service area would be sized to transport flows from a 15-year 20-minute design storm. For the storage, consideration should be given to the size of an event that can be stored vs the cost of the size of storage.

5.22 Construction Problems

The only significant 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.

5.23 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 **$23.7M**.

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 Name	Cost
P005	Idlewild Ln Storm Sewer Relief (From Hillard Rd to Dwyer Ave)	$114,211
P013	Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd)	$71,443
P004	Devon Rd Creek Stabilization	$55,835
P008	W Oak Drive Storm Sewer Relief	$267,988
P015	Glen Haven Storm Sewer Relief	$173,397
P018	Glenway Dr Storm Sewer Improvements	$573,000
P014	Inlet & Curb Replacements (Brownell, Glenvista, Berry Oaks)	$142,589
P011	Berrywood East Storage	$198,421
P009	Alexandra Ave Storm Sewer (From Sappington Road to Glenway Drive)	$487,886
P010	Berrywood West Storage	$272,519
P012	Glenmoor Ln Stormwater Improvements	$636,403
P017	Clif Side Dr Storm Sewer	$539,000
P016	Glenbrook Stormwater Storage	$938,621
P006	Juanita Ave Underground Storage	$1,042,235
P007	Brownell Ave Underground Storage	$2,128,553
P001	Edwin Ave Storm Sewer (From Sappington Rd to S Moreland Ave)	$2,068,030
P002	Parkland, Elm and Edwin Stormwater Storage	$8,328,241
P003	Willow Oak Diversion Sewer	$5,640,729
	Total Cost	**$23,680,000**

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 factors considered in the benefit/cost ratio were risk of flooding or erosion, number of homeowners that would benefit from a project, and safety. 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 50 homes impacted receiving the highest score of 3, projects impacting between 10 and 49 properties was given a score of 2 and a project impacting 9 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	Benefit Multiplier	Weighted Benefit	Cost	Benefit/Cost Ratio	Priority
P005	Idlewild Ln Storm Sewer Relief (From Hillard Rd to Dwyer Ave)	3000	0.5	1500	$114,211	26.27	1
P013	Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd)	1700	0.5	850	$71,443	23.80	2
P004	Devon Rd Creek Stabilization	1200	0.5	600	$55,835	21.49	3
P008	W Oak Drive Storm Sewer Relief	4400	1.1	4840	$267,988	16.42	4
P015	Glen Haven Storm Sewer Relief	2800	1	2800	$173,397	16.15	5
P018	Glenway Dr Storm Sewer Improvements	8600	0.5	4300	$573,000	15.01	6
P014	Inlet & Curb Replacements (Brownell, Glenvista, Berry Oaks)	2100	0.5	1050	$142,589	14.73	7
P011	Berrywood East Storage	2300	1	2300	$198,421	11.59	8
P009	Alexandra Ave Storm Sewer (From Sappington Road to Glenway Drive)	4200	1.1	4620	$487,886	8.61	9
P010	Berrywood West Storage	2300	1	2300	$272,519	8.44	10
P012	Glenmoor Ln Stormwater Improvements	4500	1.1	4950	$636,403	7.07	11
P017	Clif Side Dr Storm Sewer	2000	1.1	2200	$539,000	3.71	12
P016	Glenbrook Stormwater Storage	3400	1	3400	$938,621	3.62	13
P006	Juanita Ave Underground Storage	2400	1	2400	$1,042,235	2.30	14
P007	Brownell Ave Underground Storage	4000	1.1	4400	$2,128,553	1.88	15
P001	Edwin Ave Storm Sewer (From Sappington Rd to S Moreland Ave)	3600	1.1	3960	$2,068,030	1.74	16
P002	Parkland, Elm and Edwin Stormwater Storage	6000	1.1	6600	$8,328,241	0.72	17
P003	Willow Oak Diversion Sewer	2100	1.1	2310	$5,640,729	0.37	18

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 at 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	Total Cost	Benefit Cost Ratio
Idlewild Ln (From Hillard Rd to Dwyer Ave) Storm Sewer Relief (P005)	$114,211	7.83
Inlet & Curb Replacements (Brownell, Glenvista, Berry Oaks) (P014)	$142,589	6.55
Devon Rd Creek Stabilization (P004)	$55,835	6.00
Berrywood East Storage (P011)	$198,421	2.12
W Oak Drive Storm Sewer Relief (P008)	$267,988	2.10
Glenway Dr Storm Sewer Improvements (P018)	$573,000	2.04
Berrywood West Storage (P010)	$272,519	1.54
Glenmoor Lane Stormwater Improvements (P012)	$636,403	0.99
Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd) (P013)	$71,443	0.99
Glenbrook Stormwater Storage (P016)	$938,621	0.67
Juanita Ave Underground Storage (P006)	$1,042,235	0.66
Alexandra Ave Storm Sewer (P009)	$487,886	0.66
Glenhaven Storm Sewer Relief (P015)	$173,397	0.52
Clif Side Dr Storm Sewer (P017)	$525,000	0.43
Brownell Ave Underground Storage (P007)	$2,128,553	0.23
Edwin Ave (From Sappington Rd to S Moreland Ave) (P001)	$2,068,030	0.23
Willow Oak Diversion Sewer (P003)	$5,640,729	0.22
Parkland, Elm and Algonquin Stormwater Storage (P002)	$8,328,241	0.20

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. The recommended short-term projects are listed in the table below. Most of these projects had the highest benefit/cost ratio, but Edwin Ave Storm Sewer (From Sappington Rd to S Moreland Ave) was also included due to the safety concerns that need to be addressed in this project area. Funding and cost share options should be considered to complete these projects. The total cost of the recommended short-term projects is approximately **$4.3M**.

American Rescue Plana Act (ARPA) funding is a funding source that should currently be considered to help in completing the short-term projects. A document discussing the City's ARPA funding request can be found in **Appendix G**.

TABLE 6-4. SHORT TERM PROJECTS

Project Number	Project Name	Cost
P004	Devon Rd Creek Stabilization	$55,835
P013	Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd)	$71,443
P005	Idlewild Ln Storm Sewer Relief (From Hillard Rd to Dwyer Ave)	$114,211
P008	W Oak Drive Storm Sewer Relief	$267,988
P014	Inlet & Curb Replacements (Brownell, Glenvista, Berry Oaks)	$142,589
P009	Alexandra Ave Storm Sewer (From Sappington Road to Glenway Drive)	$487,886
P012	Glenmoor Ln Stormwater Improvements	$636,403
P001	Edwin Ave Storm Sewer (From Sappington Rd to S Moreland Ave)	$2,068,030
P017	Clif Side Dr Storm Sewer	$539,000

APPENDIX A: PROJECT MAPS

Watershed	Sub_ID	Area_Ac	Flow_CFS
Shady Grove Creek	ShadyGrove_DA_1	7.05	17
Shady Grove Creek	ShadyGrove_DA_2	8.55	20
Shady Grove Creek	ShadyGrove_DA_3	2.35	6
Shady Grove Creek	ShadyGrove_DA_4	11.2	27
Shady Grove Creek	ShadyGrove_DA_5	13.34	32
Shady Grove Creek	ShadyGrove_DA_6	38.28	91
Shady Grove Creek	ShadyGrove_DA_7	30.72	73
Shady Grove Creek	ShadyGrove_DA_8	55.14	132
Shady Grove Creek	ShadyGrove_DA_9	15.32	37
Shady Grove Creek	ShadyGrove_DA_10	29.87	71
Shady Grove Creek	ShadyGrove_DA_11	32.1	77
Shady Grove Creek	ShadyGrove_DA_12	25.79	52
Shady Grove Creek	ShadyGrove_DA_13	14.08	25
Shady Grove Creek	ShadyGrove_DA_14	13.01	31
Shady Grove Creek	ShadyGrove_DA_15	55.03	121
Warson Woods Creek	WarsonWoods_DA_1	15.88	38
Warson Woods Creek	WarsonWoods_DA_2	15.94	38
Warson Woods Creek	WarsonWoods_DA_3	8.94	21
Warson Woods Creek	WarsonWoods_DA_4	71.59	171
Warson Woods Creek	WarsonWoods_DA_5	4.22	10
Warson Woods Creek	WarsonWoods_DA_6	9.94	26
Warson Woods Creek	WarsonWoods_DA_7	11.73	28
Warson Woods Creek	WarsonWoods_DA_8	58.14	139
Warson Woods Creek	WarsonWoods_DA_9	7.59	18
Warson Woods Creek	WarsonWoods_DA_10	12.91	31
Warson Woods Creek	WarsonWoods_DA_11	12.96	31
Warson Woods Creek	WarsonWoods_DA_12	14.03	34
Rockhill Creek	Rockhill_DA_1	29.58	71
Rockhill Creek	Rockhill_DA_2	6.92	17
Rockhill Creek	Rockhill_DA_3	19.1	46
Rockhill Creek	Rockhill_DA_4	12.46	30
Rockhill Creek	Rockhill_DA_5	9.75	23
Rockhill Creek	Rockhill_DA_6	12.47	30
Rockhill Creek	Rockhill_DA_7	14.43	34
Rockhill Creek	Rockhill_DA_8	22.38	53
Rockhill Creek	Rockhill_DA_9	16.03	38
Rockhill Creek	Rockhill_DA_10	28.71	69
Rockhill Creek	Rockhill_DA_11	23.68	57
Rockhill Creek	Rockhill_DA_12	15.04	36
Rockhill Creek	Rockhill_DA_13	13.39	32
Rockhill Creek	Rockhill_DA_14	5.5	13
Rockhill Creek	Rockhill_DA_15	11.22	27
Shady Grove_Downstream	DS_Shady Grove_1	5.75	14
Shady Grove_Downstream	DS_Shady Grove_2	1.17	3
Shady Grove_Downstream	DS_Shady Grove_3	16.41	39
Gravois Creek	Gravois_DA_1	13.06	31
Gravois Creek	Gravois_DA_2	1.48	4
Gravois Creek	Gravois_DA_3	23.34	56
Gravois Creek	Gravois_DA_4	23.55	56
Gravois Creek	Gravois_DA_5	22.76	54
Shady Grove_Downstream	DS_Shady Grove_4	15.38	37

Warson Woods

Rock Hill

DA = 241 Ac
Q = 576 cfs

DA = 244 Ac
Q = 585 cfs

DA = 812 Ac
Q = 352 cfs

Webster Groves

Lower Algonquin
Study Area

Algonquin
Golf Club

Kirkwood

Oakland

Legend

- Existing Sanitary Sewer
- Existing Storm Sewer
- Unimproved Stream
- Property Lines
- City Limits
- Glendale City Limits
- Rockhill Creek Drainage Area
- Warson Woods Creek Feeder Drainage Area
- Shady Grove Creek Drainage Area
- Sub Watersheds

N

1,200 600 0 1,200 Feet

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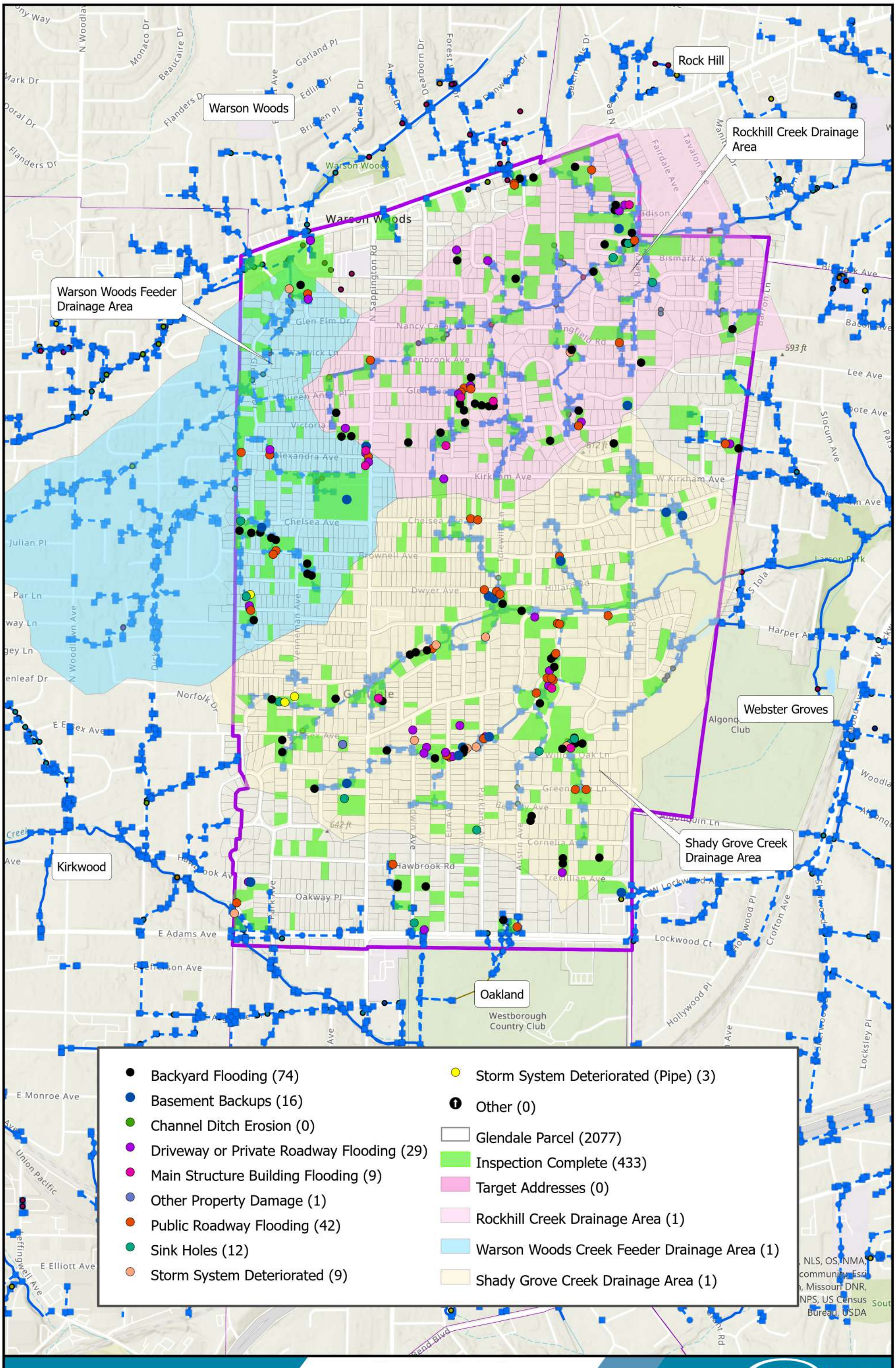
St. Louis, Missouri 63101
PHONE: 314.621.3395

Glendale Stormwater Master Plan Drainage Area Map

Sheet: Exhibit 1

Date: 12/17/2021



Glendale Stormwater Master Plan
Exhibit 2
Field Work Progress
March 4, 2022

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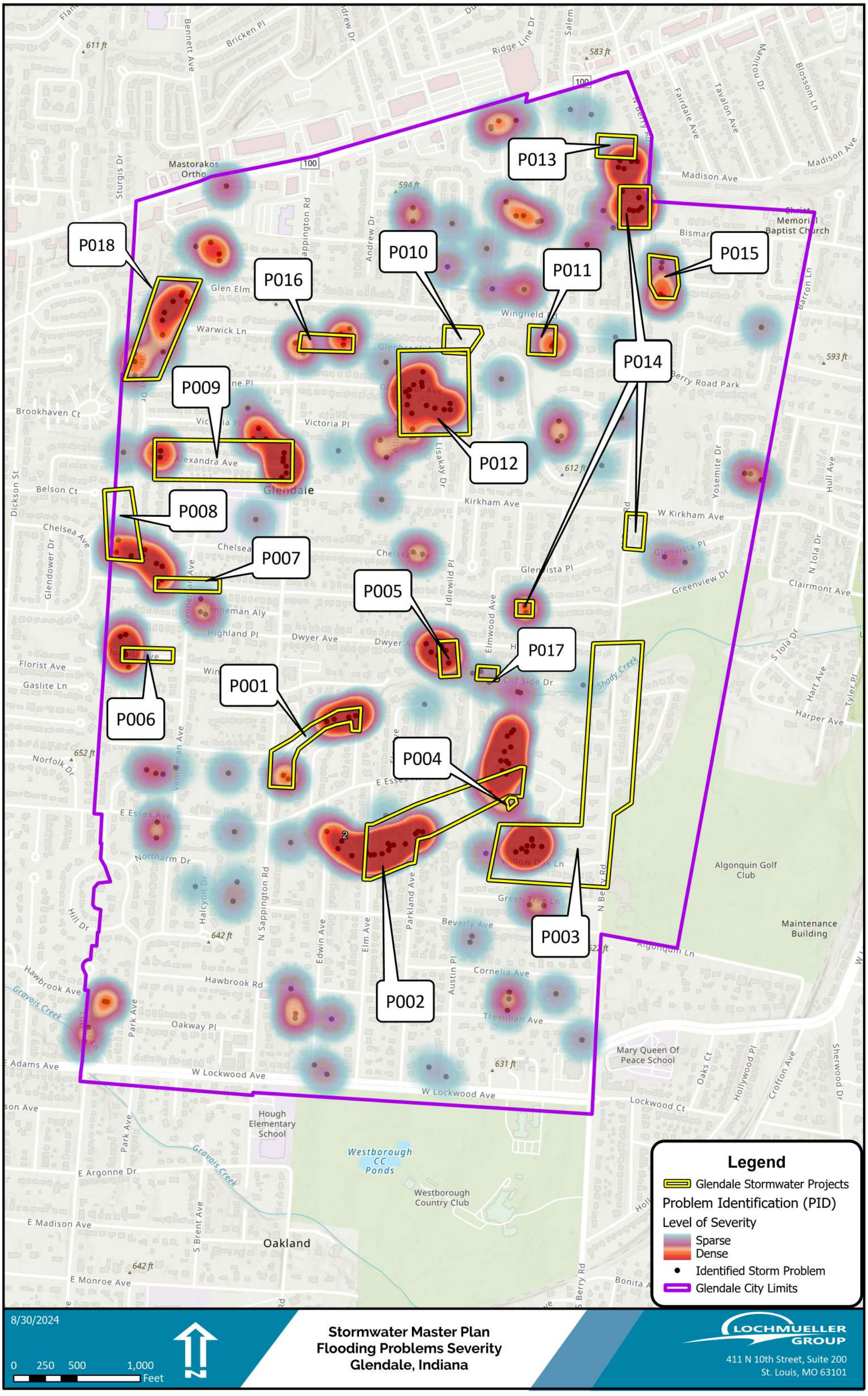
P018
P016
P010
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P015
P014
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P012
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P001
P006
P004
P003
P002
Legend
Glendale Stormwater Projects
Problem Identification (PID)
Level of Severity
Sparse
Dense
Identified Storm Problem
Glendale City Limits
8/30/2024
0 250 500 1,000
Feet
Stormwater Master Plan
Flooding Problems Severity
Glendale, Indiana
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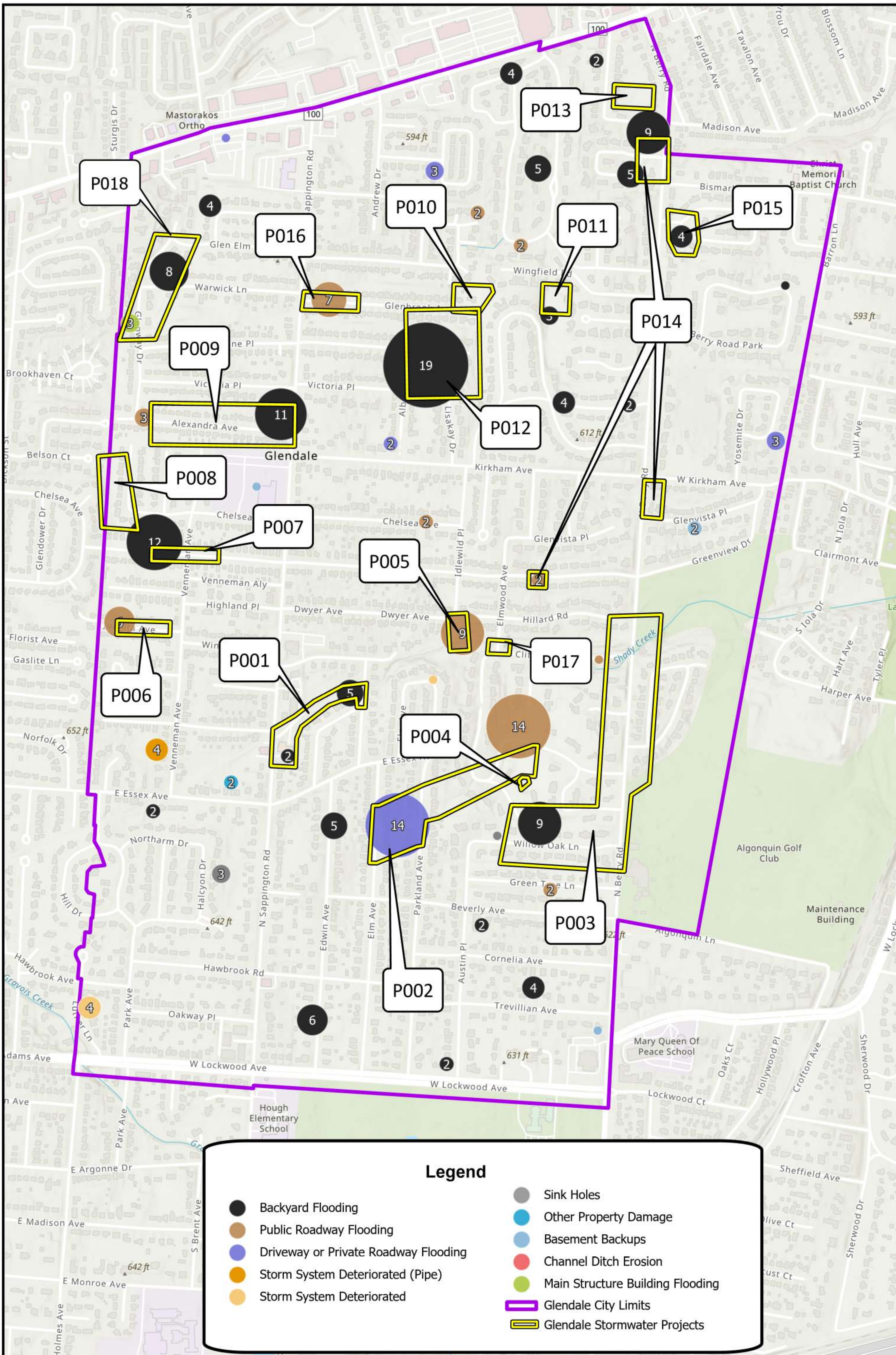
St. Louis, MO 63101



8/30/2024

Stormwater Master Plan
Flooding Problems, Dominant Issue
Glendale, Indiana

*Numbers represent the total problems of all issues, colors indicate the dominant problem.

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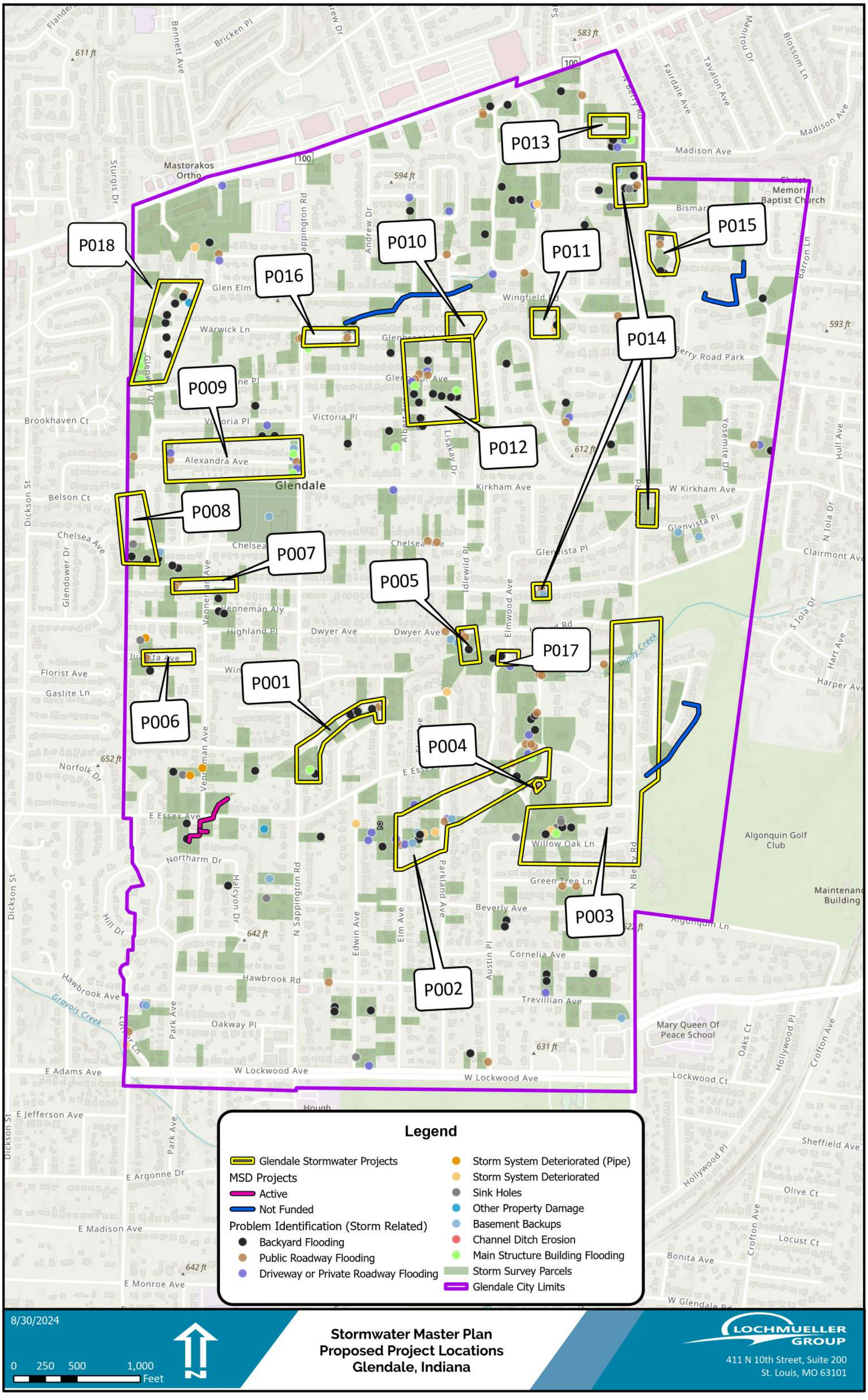
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P005
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P006
P004
P003
P002
Glendale
Mastorakos Ortho
Glen Elm
Warwick Ln
Brookhaven Ct
Alexandra Ave
Victoria Pl
Wingfield Rd
Berry Road Park
Madison Ave
Kirkham Ave
W Kirkham Ave
Belson Ct
Chelsea Ave
Glendower Dr
Glenvista Pl
Venneman Aly
Highland Pl
Dwyer Ave
Florist Ave
Gaslite Ln
Norfolk Dr
E Essex Ave
Northarm Dr
Willow Oak Ln
Green Tree Ln
Beverly Ave
Cornelia Ave
Trevillian Ave
Hawbrook Rd
Hawbrook Ave
Oakway Pl
Gravois Creek
Shady Creek
Algonquin Golf Club
Mary Queen Of Peace School
Maintenance Building
W Lockwood Ave
E Adams Ave
E Jefferson Ave
E Argonne Dr
E Madison Ave
E Monroe Ave
Lockwood Ct
Sheffield Ave
Olive Ct
Locust Ct
Bonita Ave
Harper Ave
Clairmont Ave
Hull Ave
Yosemite Dr
Barron Ln
Madison Ave
Bennett Ave
Bricken Pl
Sturgis Dr
Sappington Rd
Andrew Dr
Fairdale Ave
Tavalon Ave
Blossom Ln
Idlewild Pl
Elmwood Ave
Lisakay Dr
Albert Ave
Parkland Ave
Edwin Ave
Elm Ave
Austin Pl
Halcyon Dr
Hill Dr
Dickson St
Park Ave
Hollywood Pl
Crofton Ave
Oaks Ct
S Iola Dr
N Iola Dr
Hart Ave
611 ft
583 ft
594 ft
593 ft
612 ft
652 ft
642 ft
631 ft
100
Legend
Glendale Stormwater Projects
MSD Projects
Active
Not Funded
Problem Identification (Storm Related)
Backyard Flooding
Public Roadway Flooding
Driveway or Private Roadway Flooding
Storm System Deteriorated (Pipe)
Storm System Deteriorated
Sink Holes
Other Property Damage
Basement Backups
Channel Ditch Erosion
Main Structure Building Flooding
Storm Survey Parcels
Glendale City Limits
8/30/2024
0 250 500 1,000
Feet
N
Stormwater Master Plan
Proposed Project Locations
Glendale, Indiana
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APPENDIX B: MAPS

sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Missouri State Plane coordinate system, east zone (FIPSZONE 2401), Transverse Mercator projection. Horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid or projection used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this map was provided in digital format by the U.S. Farm Service Agency, National Agricultural Imagery Program (NAIP), published in 2010 at a scale of 1:12000.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

The "**profile base lines**" depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line" in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

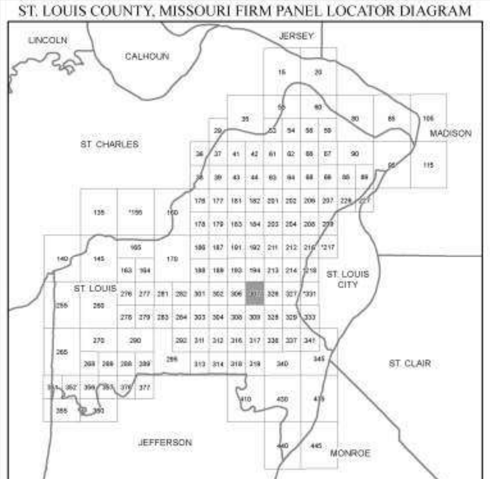
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center (MSC)** via the FEMA Map Information eXchange (FMIX) at 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA MSC may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

ST. LOUIS COUNTY, MISSOURI FIRM PANEL LOCATOR DIAGRAM



has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
CBRS and OPA boundary
International, State, or County boundary
Corporate, Extraterritorial Jurisdiction, or Urban Growth boundary
Area Not Included boundary
Military Reservation, Native American Lands boundary
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988
(A)—(A) Cross section line
(23)—(23) Transect line
87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}76^{000m}$E — 1000-meter Universal Transverse Mercator grid values, zone 15
600000 FT — 5000-foot grid ticks: Missouri State Plane coordinate system, east zone (FIPSZONE 2401), Transverse Mercator projection
DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5 — River Mile
Aqueduct, Culvert, Flume, Penstock, or Storm Sewer
Road or Railroad Bridge

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
AUGUST 2, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

February 4, 2015 – to update corporate limits, to change Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to add roads and road names, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0307K

FIRM
FLOOD INSURANCE RATE MAP

ST. LOUIS COUNTY, MISSOURI
AND INCORPORATED AREAS

PANEL 307 OF 445
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FRONTENAC, CITY OF	290353	0307	K
GLENDALE, CITY OF	290354	0307	K
HUNTLEIGH, CITY OF	290359	0307	K
KIRKWOOD, CITY OF	290362	0307	K
LADUE, CITY OF	290363	0307	K
ROCK HILL, CITY OF	290382	0307	K
ST LOUIS COUNTY	290327	0307	K
WARSON WOODS, CITY OF	290393	0307	K

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
29189C0307K

MAP REVISED

sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Missouri State Plane coordinate system, east zone (FIPSZONE 2401), Transverse Mercator projection. Horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid or projection used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this map was provided in digital format by the U.S. Farm Service Agency, National Agricultural Imagery Program (NAIP), published in 2010 at a scale of 1:12000.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

The "**profile base lines**" depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line" in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

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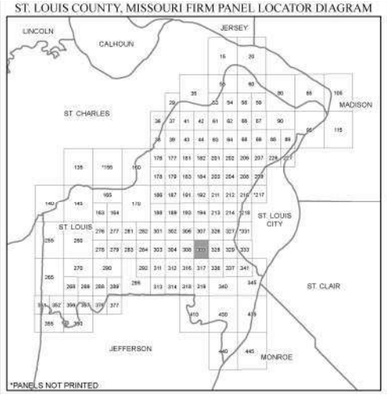
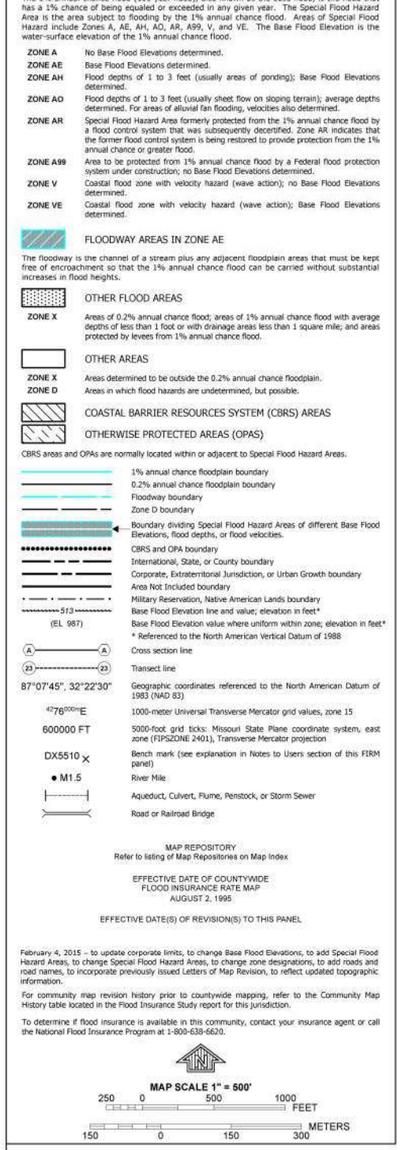
ST. LOUIS COUNTY, MISSOURI FIRM PANEL LOCATOR DIAGRAM



*PANELS NOT PRINTED



ZONE A EL 987 FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
AUGUST 2, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

February 4, 2015 - to update corporate limits, to change Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to add roads and road names, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0309K

FIRM
FLOOD INSURANCE RATE MAP

ST. LOUIS COUNTY, MISSOURI AND INCORPORATED AREAS

PANEL 309 OF 445
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CRESTWOOD, CITY OF	290343	0309	K
GLENDALE, CITY OF	290354	0309	K
KIRKWOOD, CITY OF	290362	0309	K
OAKLAND, CITY OF	290373	0309	K
ST. LOUIS COUNTY	290327	0309	K
WEBSTER GROVES, CITY OF	290394	0309	K

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
29189C0309K

MAP REVISED

sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Missouri State Plane coordinate system, east zone (FIPSZONE 2401), Transverse Mercator projection. Horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid or projection used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

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The "**profile base lines**" depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line" in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

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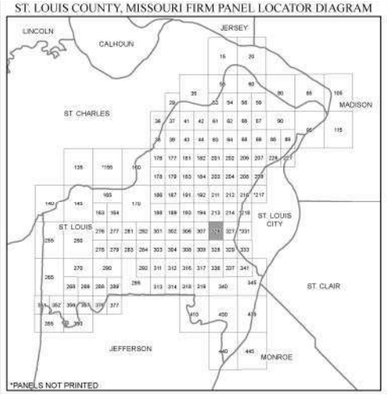
ST. LOUIS COUNTY, MISSOURI FIRM PANEL LOCATOR DIAGRAM



*PANELS NOT PRINTED

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
	CBRS and OPA boundary
	International, State, or County boundary
	Corporate, Extraterritorial Jurisdiction, or Urban Growth boundary
	Area Not Included boundary
	Military Reservation, Native American Lands boundary
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*
	* Referenced to the North American Vertical Datum of 1988
A A	Cross section line
23 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4276000mE	1000-meter Universal Transverse Mercator grid values, zone 15
600000 FT	5000-foot grid ticks: Missouri State Plane coordinate system, east zone (FIPSZONE 2401), Transverse Mercator projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile
	Aqueduct, Culvert, Flume, Penstock, or Storm Sewer
	Road or Railroad Bridge

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
AUGUST 2, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

February 4, 2015 - to update corporate limits, to change Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to add roads and road names, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0326K

FIRM
FLOOD INSURANCE RATE MAP

ST. LOUIS COUNTY, MISSOURI
AND INCORPORATED AREAS

PANEL 326 OF 445
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BRENTWOOD, CITY OF	290338	0326	K
GLENDALE, CITY OF	290354	0326	K
LADUE, CITY OF	290363	0326	K
ROCK HILL, CITY OF	290382	0326	K
WEBSTER GROVES, CITY OF	290394	0326	K

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
29189C0326K

MAP REVISED

sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Missouri State Plane coordinate system, east zone (FIPSZONE 2401), Transverse Mercator projection. Horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid or projection used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

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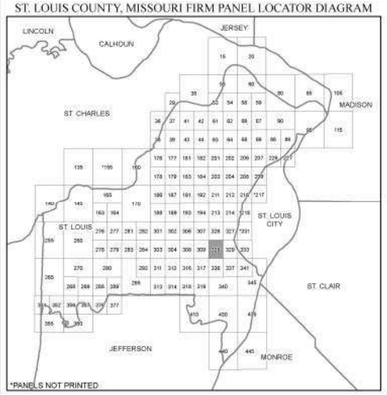
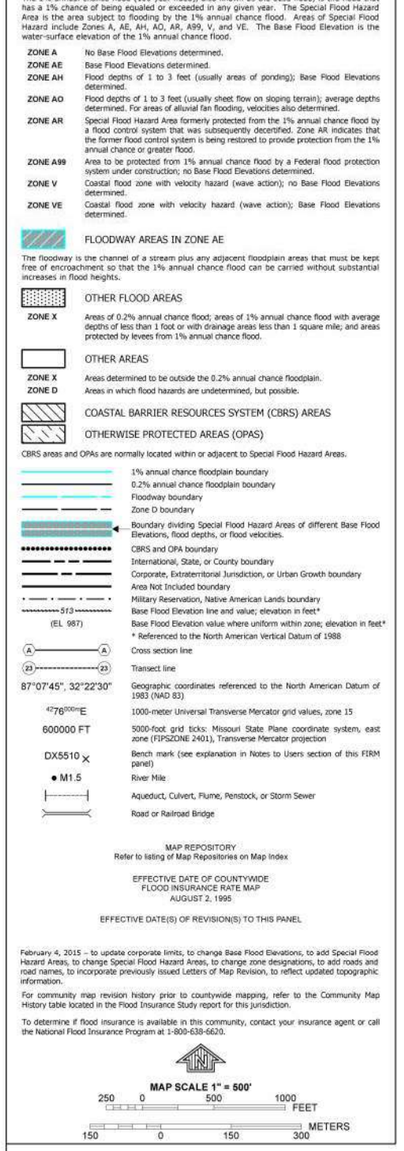
ST. LOUIS COUNTY, MISSOURI FIRM PANEL LOCATOR DIAGRAM



*PANELS NOT PRINTED



NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0328K

FIRM
FLOOD INSURANCE RATE MAP

ST. LOUIS COUNTY, MISSOURI
AND INCORPORATED AREAS

PANEL 328 OF 445
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CRESTWOOD, CITY OF	290343	0328	K
GLENDALE, CITY OF	290354	0328	K
MARLBOROUGH, VILLAGE OF	290368	0328	K
ST. LOUIS COUNTY	290327	0328	K
WEBSTER GROVES, CITY OF	290394	0328	K

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
29189C0328K

MAP REVISED

Exhibit 6

Hydrologic Soil Group—St. Louis County and St. Louis City, Missouri

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

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 22, Sep 7, 2021

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

Date(s) aerial images were photographed: Sep 17, 2018—Oct 24, 2018

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
60025	Urban land-Harvester complex, 2 to 9 percent slopes		113.9	13.3%
60138	Iva-Urban land complex, 1 to 3 percent slopes	C/D	180.0	21.0%
60222	Urban land-Harvester complex, 0 to 2 percent slopes		41.7	4.9%
60223	Urban land-Harvester complex, 9 to 20 percent slopes		125.4	14.6%
60250	Winfield-Urban land complex, 2 to 5 percent slopes	C	177.5	20.7%
60251	Winfield-Urban land complex, 5 to 9 percent slopes	C	153.6	18.0%
60252	Winfield-Urban land complex, 9 to 20 percent slopes	C	29.5	3.4%
68001	Fishpot-Urban land-Freeburg complex, 0 to 2 percent slopes, frequently flooded	C	19.1	2.2%
68015	Fishpot-Urban land-Freeburg complex, 0 to 3 percent slopes	C	15.2	1.8%
Totals for Area of Interest			**855.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX C: COMMUNICATION

NOTICE OF VIRTUAL PUBLIC MEETING: GLENDALE STORMWATER MASTER PLAN

The City of Glendale and the City Engineer, Lochmueller Group, will be holding a virtual public meeting to discuss recommended improvements in accordance with the Glendale 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 Glendale.

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 or smartphone are recommended to be able to view the presentation. Registration is required to participate. To register visit https://www.glendalemo.org/ or go to the link: https://zoom.us/webinar/register/WN_sPYM_9mBTq-MX92vI3QFNg. After registering, you will receive a confirmation email containing information about joining the webinar. If you are unable to attend, a recording of the webinar will be available following the meeting.

At the meeting, a presentation will be given to explain the Stormwater Master Plan, and exhibits will be shown which 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 one or both virtual public meetings on Wednesday, May 25th from 6:00 PM to 7:30 PM and/or Wednesday, June 1st 6:00 PM to 7:30 PM. The information presented will be the same at both meetings.

VIRTUAL PUBLIC MEETING DATES

May 25, 2022 and June 1, 2022 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: lrightler@lochgroup.com

January 17, 2022

NOTICE OF STORMWATER ASSESMENT:FIELD WORK

The City of Glendale 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 Glendale. The City of Glendale has contracted with Lochmueller Group, the City Engineer, 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).

This work is outlined in Ordinance No.15693 - Deer Creek OMCI (Operations Maintenance Construction Improvements) Reimbursement Program for the City of Glendale, Agreement (13487) with the Metropolitan St. Louis Sewer District (MSD).

If you have any questions or comments about the Stormwater Master Plan, please contact one of the following:

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
Phone: (314) 446-4484
Email: lrightler@lochgroup.com

To contact the City of Glendale's Public Works Department, please call City Hall at (314) 965-3600 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.

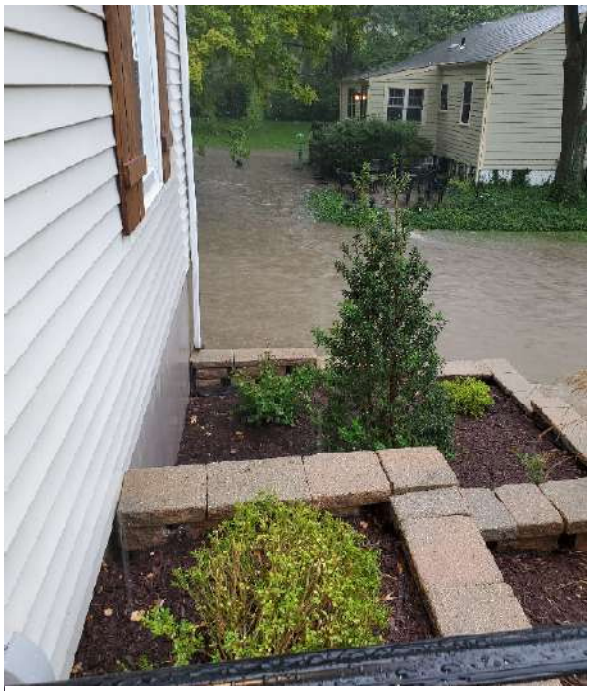
APPENDIX D: PHOTO LOG

Appendix D – Photo Log

6 Algonquin Estates – Aftermath of a flooded house

6 Algonquin Estates – Aftermath of a flooded house

6 S Moreland Ave – Flooded Street and driveway



6 S Moreland Ave – Flooded driveway and flooded backyard of 4 S Moreland Ave

6 S Moreland Ave – S Moreland Ave street flooding

15 Willow Oak Ln – Flooded backyard

15 Willow Oak Ln – Flooded backyard

15 Willow Oak Ln – Flooded driveway and garage.

15 Willow Oak Ln – Flooded backyard

42 Frederick Ln – Flooding over culvert on Frederick Ln

42 Frederick Ln – Creek overtopping the creek bank in the front yard of 42 Frederick Ln

Appendix D – Photo Log

14 Cheyenne Ct – Water flows from

258 Parkland Ave – Police cruiser that stalled due to flood water

258 Parkland Ave – Flood waters over driveway and front yard.

258 Parkland Ave – The inlets were not sufficient to take on the water in August 2019 and the main structure and basement of the house at 258 Parkland Ave flooded.

715 W Oak Dr – Water flowing from Brownell Ave to W Oak Dr. Area inlet submerged and unable to take on the volume of water.

715 W Oak Dr – Water flowing through backyard along the path of the storm sewer

731 Juanita Ave – Street flooding and water backing up and flowing down driveway at 721 Juanita Ave

777 Edwin Ave - Creek overtopping and backyard flooding

Appendix D – Photo Log

777 Edwin Ave – Overtopping of creek and flooding of backyards. Water flowing through backyards.

815 Alexandra Ave – Flooding in the street due to insufficient storm sewer and inlets on the street

1056 Glenmoor Ln – Backyard flooding

987 Dwyer Ave – Backyard Flooding

APPENDIX E: PROJECT EXHIBITS

Project # P001
Edwin Ave Underground Detention
(From Sappington Rd to S Moreland Ave)

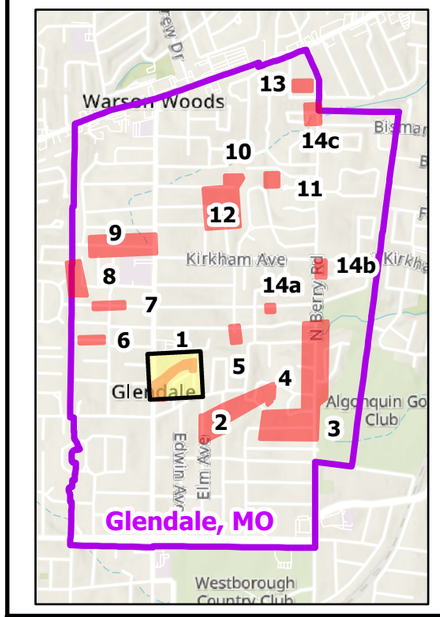
Install underground detention systems at City Hall and offline stormwater BMP storage cells along Edwin Avenue. Add an inlet on S Moreland Avenue. The project will impact 8 properties and 2 permanent easements will be required.

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

Project Name: Edwin Ave Storm Sewer (From Sappington Rd to S Moreland Ave)

Project Number: P001

Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
4I80000000000D	Inlet - Double	EA	$3,100	1	$3,100
4I2000240000ST	Pipe Sewer 24" (storm)	LF	$105	36	$3,799
	Underground Detention (3 areas)	SF	$125	7916	$989,549
6J300006003BOX	Box Culvert - Reinf. Concrete 6x3	LF	$555	34	$18,652
3H500000000000C	Excavation	CY	$28	1555	$43,547
4I1300000000000	Granular Backfill	CY	$55	900	$49,500
9D6c000000000	Sidewalks & Driveways - Asphaltic Concrete	SY	$162	1101	$178,401
9D6b0000000000	Sidewalks & Driveways - Concrete	SY	$100	26	$2,588
9D400000000000	Street Pavement - Concrete	SY	$85	214	$18,197
8H4000000000BG	Sodding - Bluegrass	SY	$13	110	$1,431
				Subtotal:	**$1,308,764**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$45,807
8H000000000000	Protection and Restoration	LS	14%	1	$183,227
				Subtotal:	**$229,034**
			Construction Costs:		**$1,537,798**
	Engineering	LS	20%	1	$307,560
	Easements and Land Acquistion	LS		1	$34,670
	Contingnecy	LS	10%	1	$188,003
				Total Costs:	**$2,068,030**

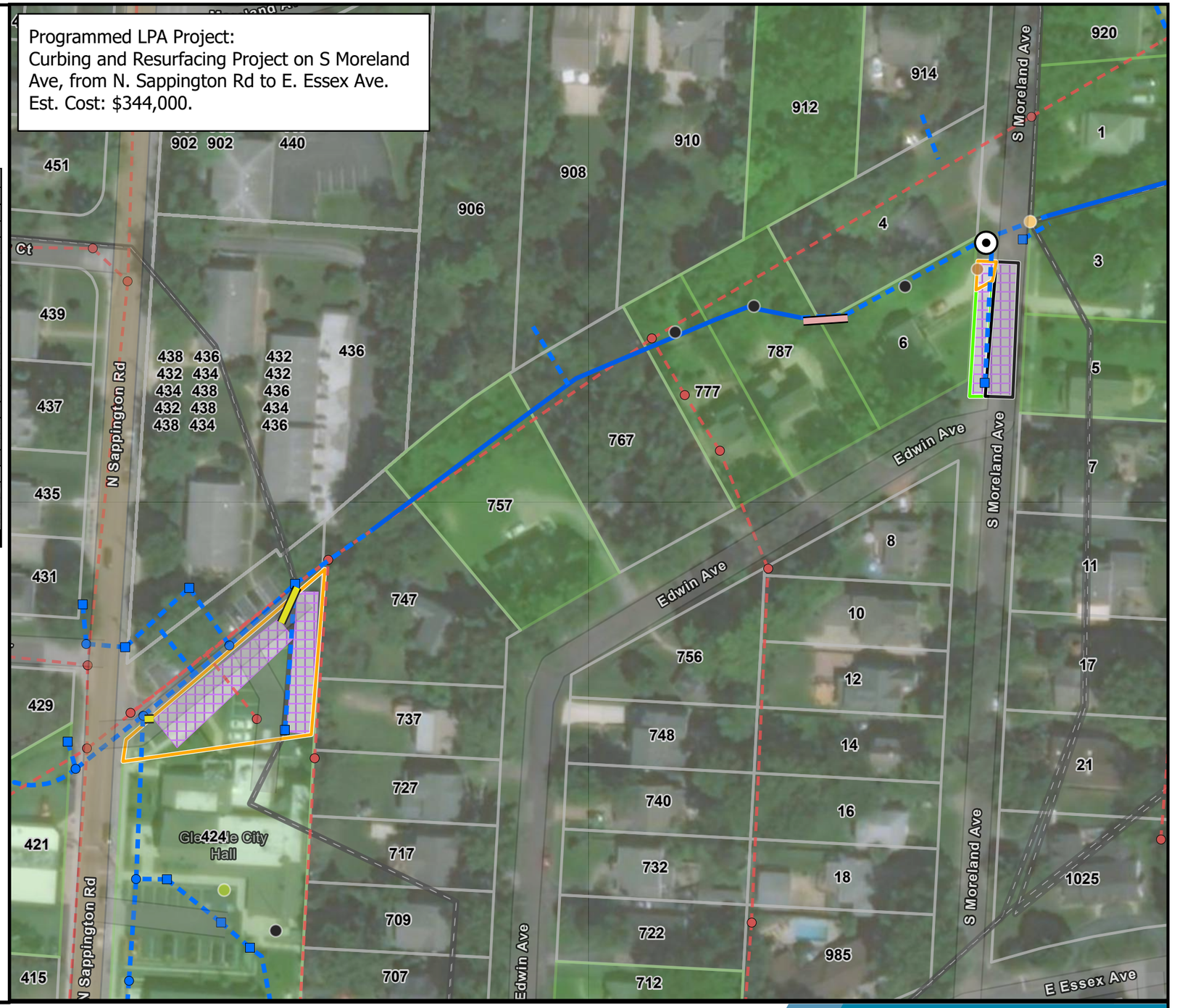


Legend

Structures
- Inlet - Double
- Pipe Sewer 24" (Storm)
- Concrete Box Culvert 6x3
- Underground Detention
- Sodding Bluegrass
- Street Pavement
- Sidewalks & Driveways
- Stormwater Channel
- Existing Storm Water Manhole
- Existing Storm Water Inlet
- Existing Stormwater Network
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)
- Backyard Flooding
- Main Structure Building Flooding
- Public Roadway Flooding
- Storm System Deteriorated
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds

Programmed LPA Project:
Curbing and Resurfacing Project on S Moreland Ave, from N. Sappington Rd to E. Essex Ave.
Est. Cost: $344,000.



7/6/2022

0 50 100 200 Feet

N

Stormwater Master Plan
Project #: P001 - Edwin Ave Underground Detention
(From Sappington Rd to S Moreland Ave)
Glendale, Missouri

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

Project # P002
Parkland, Elm and Algonquin Stormwater Storage

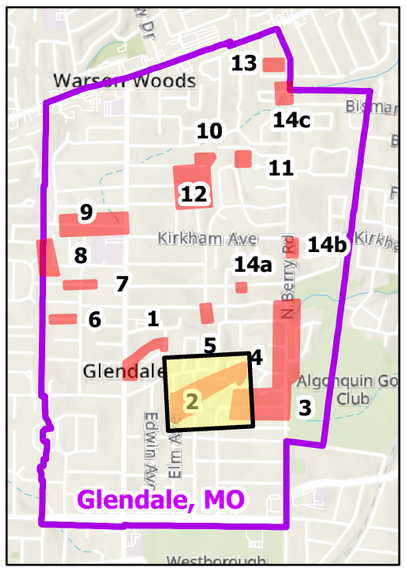
Install underground detention systems and stormwater BMP cells along Parkland Ave, Elm Ave and Algonquin Estates.
The project will benefit 217 properties and 1 permanent easements will be required.

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

Project Name: Parkland, Elm and Edwin Stormwater Storage

Project Number: P002

Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
4I8000000000ST	Inlet - Street	EA	$2,050	1	$2,050
4I2000150000ST	Pipe Sewer 15" (storm)	LF	$95	60	$5,745
4I2000180000ST	Pipe Sewer 18" (storm)	LF	$100	359	$35,855
4I2000240000ST	Pipe Sewer 24" (storm)	LF	$105	97	$10,174
4I2000300000ST	Pipe Sewer 30" (storm)	LF	$150	2	$369
	Underground Detention	SF	$125	35978	$4,497,219
3H500000000000C	Excavation	CY	$28	7287	$204,035
4I130000000000	Granular Backfill	CY	$55	4587	$252,303
8H4000000000BG	Sodding - Bluegrass	SY	$13	2074	$26,961
9D400000000000	Street Pavement - Asphaltic Concrete Rem. and Rep.	SY	$85	2914	$247,721
				Subtotal:	**$5,282,432**
1G6a0000000MOB	Mobilization	LS	3.5%	1	$184,885
8H000000000000	Protection and Restoration	LS	14%	1	$739,540
				Subtotal:	**$924,426**
			Construction Costs:		**$6,206,857**
	Engineering	LS	20%	1	$1,241,371
	Easements and Land Acquistion	LS		1	$122,900
	Contingnecy	LS	10%	1	$757,113
				Total Costs:	**$8,328,241**

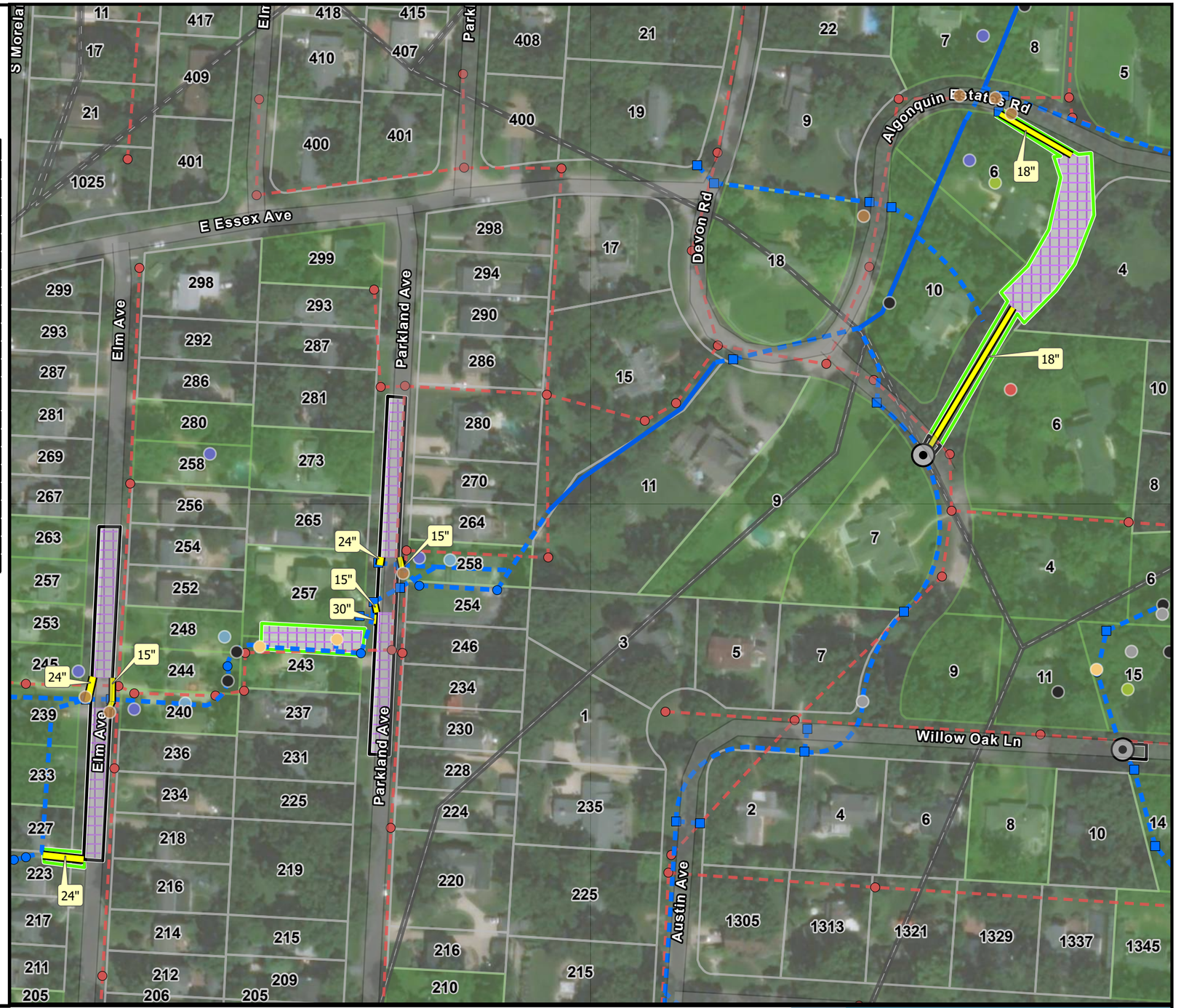


Legend

- Pipe Sewer 15" (Storm)
- Pipe Sewer 18" (Storm)
- Pipe Sewer 24" (Storm)
- Pipe Sewer 30" (Storm)
- Underground Detention
- Sodding Bluegrass
- Street Pavement
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Stormwater Channel
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Basement Backups
- Channel Ditch Erosion
- Driveway or Private Roadway Flooding
- Main Structure Building Flooding
- Public Roadway Flooding
- Sink Holes
- Storm System Deteriorated
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds



7/6/2022

0 25 50 100 150 200 Feet

N

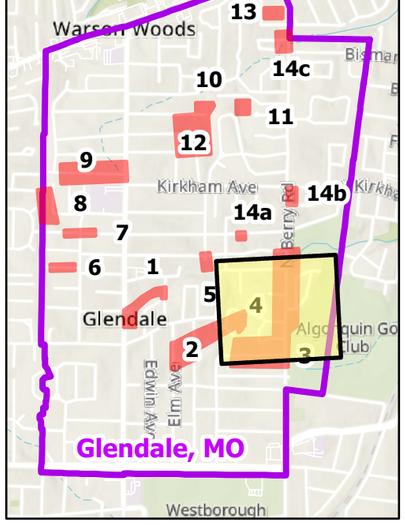
Stormwater Master Plan
Project #: P002
Parkland, Elm and Algonquin Stormwater Storage
Glendale, Missouri

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

Project # P003
Willow Oak Diversion Sewer

Construct 2,100 LF of 36-inch storm sewer from Willow Oak Lane, with a diversion structure on Willow Oak Lane.
The project will benefit 33 properties and no permanent easements will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Willow Oak Diversion Sewer					
Project Number: P003					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I8000000000ST	Inlet- Street	EA	$2,050	6	$12,300
4G0000000000SX	Outlet Structure	LS	$6,500	1	$6,500
7O200036000000X	Pipe in Tunnel 36"	LF	$170	2093	$3,589,325
3H500000000000C	Excavation	CY	$28	29	$813
9D400000000000	Street Pavement - Asphaltic Concrete Rem. And Rep.	SY	$85	328	$27,896
				Subtotal:	**$3,636,834**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$127,289
8H000000000000	Protection and Restoration	LS	14%	1	$509,157
				Subtotal:	**$636,446**
			Construction Costs:		**$4,273,280**
	Engineering	LS	20%	1	$854,656
	Contingnecy	LS	10%	1	$512,794
				Total Costs:	**$5,640,729**

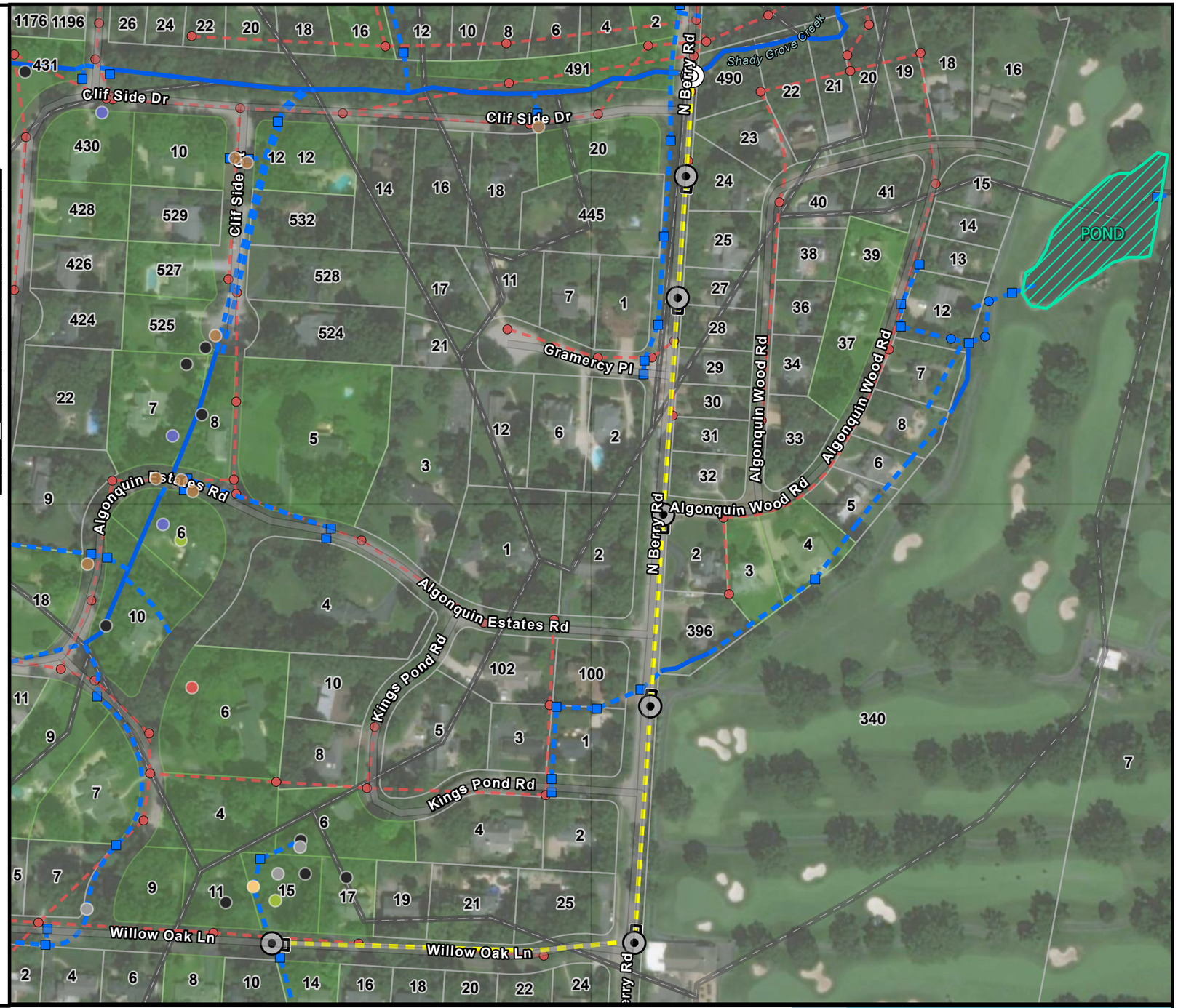


Legend

- Outlet Structure
- Inlet-Street
- Pipe in Tunnel 36"
- Street Pavement
- Existing Storm Water Manhole
- Existing Storm Water Inlet
- Existing Stormwater Network
- Stormwater Channel
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Channel Ditch Erosion
- Driveway or Private Roadway Flooding
- Main Structure Building Flooding
- Public Roadway Flooding
- Sink Holes
- Storm System Deteriorated
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds



7/6/2022

0 50 100 200 300 400 Feet

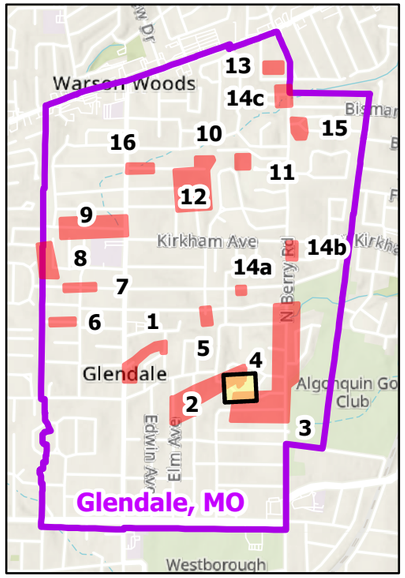
Stormwater Master Plan
Project #: P003
Willow Oak Diversion Sewer
Glendale, Missouri

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

Project # P004
Devon Rd Creek Stabilization

Construct 33 linear feet of slope stabilization along channel. The project will benefit 1 property and 1 permanent easement will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Devon Rd Creek Stabilization					
Project Number: P004					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
6J500000000000	Gabions in Place	CY	$200	110	$22,000
3H50000000000C	Excavation	CY	$28	45	$1,260
				Subtotal:	**$23,260**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$814
8H000000000000	Protection and Restoration	LS	14%	1	$3,256
				Subtotal:	**$4,071**
				Construction Costs:	**$27,331**
	Engineering	LS	20%	1	$5,466
	Permitting and Survey	LS		1	$15,478
	Contingnecy	LS	10%	1	$7,561
				Total Costs:	**$55,835**



Legend

- Slope Stabilization
- Existing Storm Water Inlet
- Existing Stormwater Network
- Stormwater Channel
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Channel Ditch Erosion
- Sink Holes
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds

11/11/2022

0 25 50 100 Feet

N

Stormwater Master Plan
Project # P004
Devon Rd Creek Stabilization
Glendale, Missouri

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

Project # P005
Idlewild Ln Storm Sewer Relief
(From Hillard Rd to Dwyer Ave)

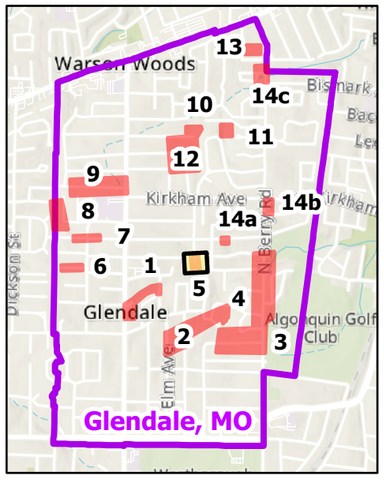
Replace 183 linear feet of 24-inch storm sewer with 30-inch storm sewer. The project will benefit 57 properties and 2 permanent easements will be required.

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

Project Name: Idlewild Ln Storm Sewer Relief (From Hillard Rd to Dwyer Ave)

Project Number: P005

Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
4I8000000000AI	Inlet- Area	EA	$2,050	1	$2,050
4I80000000000D	Inlet - Double	EA	$3,100	1	$3,100
4G0000000000OSX	Outlet Structure	LS	$6,500	1	$6,500
4I20003000RCPV	Reinforced Concrete Pipe Sewer 30" Class V	LF	$170	182	$31,014
3H500000000000C	Excavation	CY	$28	205	$5,752
4I130000000000	Granular Backfill	CY	$55	21	$1,164
9D400000000000	Street Pavement - Asphaltic Concrete Rem. And Rep.	SY	$85	11	$972
8H500000000000	Seeding	SY	$3	32	$81
8H4000000000BG	Sodding - Bluegrass	SY	$13	80	$1,034
				Subtotal:	**$51,665**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$1,808
8H000000000000	Protection and Restoration	LS	14%	1	$7,233
				Subtotal:	**$9,041**
			Construction Costs:		**$60,707**
	Engineering	LS	20%	1	$12,141
	Easements and Land Acquistion	LS		1	$30,980
	Contingnecy	LS	10%	1	$10,383
				Total Costs:	**$114,211**



Legend

- OUTLET STRUCTURE
- Inlet - Double
- Inlet-Area
- REINFORCED CONCRETE PIPE 30"
- Sodding Bluegrass
- Seeding
- Street Pavement
- Existing Storm Water Inlet
- Existing Stormwater Network
- Stormwater Channel
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Basement Backups
- Public Roadway Flooding
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds

7/6/2022

N

0 25 50 100 Feet

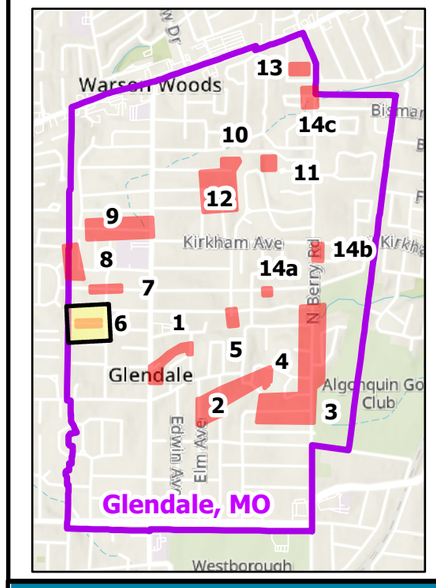
Stormwater Master Plan
Project # P005
Idlewild Ln Storm Sewer Relief
(From Hillard Rd to Dwyer Ave)
Glendale, Missouri

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

Project # P006
Juanita Ave Underground Storage

Install underground detention system.
The project will benefit 27 properties and no permanent easement will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Juanita Ave Underground Storage					
Project Number: P006					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I2000180000ST	Pipe Sewer 18" (Storm)	LF	$100	32.101	$3,210
S1	Underground Detention	SF	$125	4291.65	$536,456
3H50000000000C	Excavation	CY	$28	819.72	$22,952
4I130000000000	Granular Backfill	CY	$55	819.64	$45,080
9D6c000000000	Sidewalks & Driveways - Asphaltic Concrete	SY	$162	15.48	$2,508
9D400000000000	Street Pavement - Asphaltic Concrete	SY	$85	576.40	$48,994
8H4000000000BG	Sodding - Bluegrass	SY	$13	18.73	$244
				Subtotal:	**$659,444**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$23,081
8H000000000000	Protection and Restoration	LS	14%	1	$92,322
				Subtotal:	**$115,403**
				Construction Costs:	**$774,847**
	Engineering	LS	20%	1	$154,969
	Easements and Land Acquistion	LS		1	$17,670
	Contingnecy	LS	10%	1	$94,749
				Total Costs:	**$1,042,235**



Legend

- PIPE SEWER 18 INCH (STORM)
- Underground Detention
- Sodding Bluegrass
- Street Pavement
- Sidewalks & Driveways
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Driveway or Private Roadway Flooding
- Public Roadway Flooding
- Sink Holes
- Storm System Deteriorated (Pipe)
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds

7/6/2022

0 25 50 100 Feet

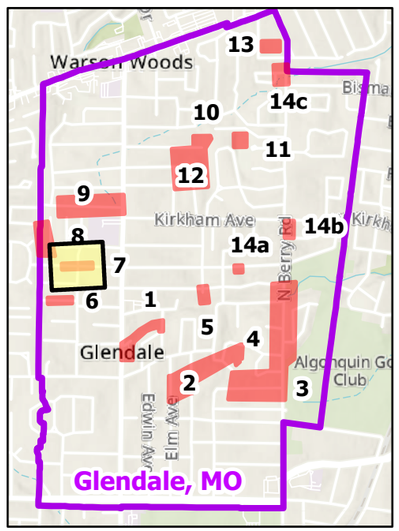
Stormwater Master Plan
Project # P006
Juanita Ave Underground Storage
Glendale, Missouri

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

Project # P007
Brownell Ave Underground Storage

Install underground detention system.
The project will benefit 20 properties and no permanent easement will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Brownell Ave Underground Storage					
Project Number: P007					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I2000150000ST	Pipe Sewer 15" (storm)	LF	$95	19.63	$1,865
4I2000180000ST	Pipe Sewer 18" (storm)	LF	$100	20.44	$2,044
S1	Underground Detention	SF	$125	8946.38	$1,118,297
3H50000000000C	Excavation	CY	$28	1687.91	$47,261
4I130000000000	Granular Backfill	CY	$55	1687.07	$92,789
9D6b0000000000	Sidewalks & Diverways - Concrete	SY	$100	7.33	$733
9D5b0000000000	Street Pavement - Concrete Rem. and Rep.	SY	$80	493.48	$39,479
9D400000000000	Street Pavement - Asphaltic Concrete Rem. and Rep.	SY	$85	586.58	$49,859
8H4000000000BG	Sodding - Bluegrass	SY	$13	16.17	$210
				Subtotal:	**$1,352,538**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$47,339
8H000000000000	Protection and Restoration	LS	14%	1	$189,355
				Subtotal:	**$236,694**
				Construction Costs:	**$1,589,232**
	Engineering	LS	20%	1	$317,846
	Easements and Land Acquistion	LS		1	$27,970
	Contingnecy	LS	10%	1	$193,505
				Total Costs:	**$2,128,553**

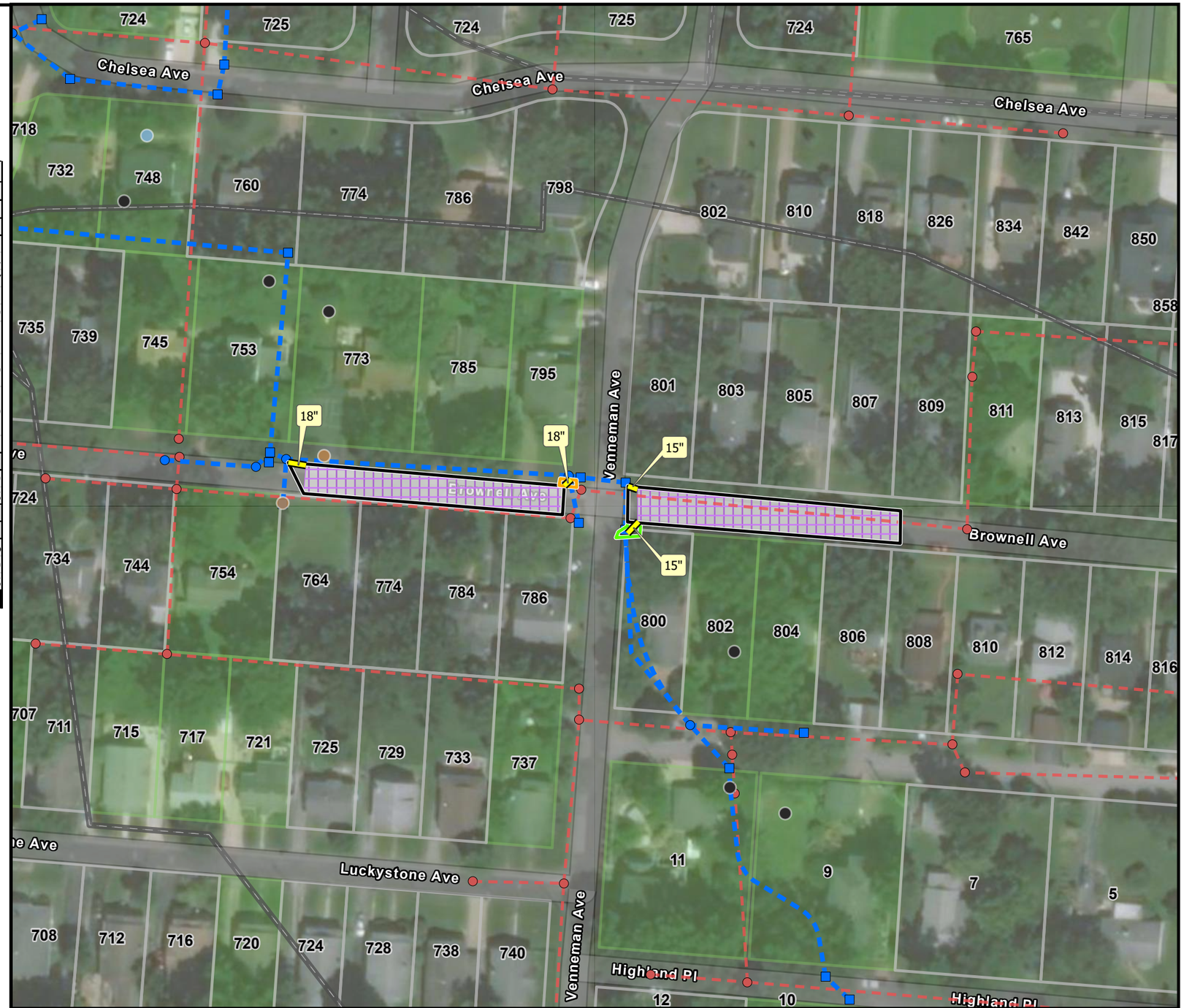


Legend

- PIPE SEWER 15 INCH (STORM)
- PIPE SEWER 18 INCH (STORM)
- Underground Detention
- Sodding Bluegrass
- Street Pavement
- Sidewalks & Driveways
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Basement Backups
- Public Roadway Flooding
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds



7/6/2022

0 25 50 100 150 200 Feet

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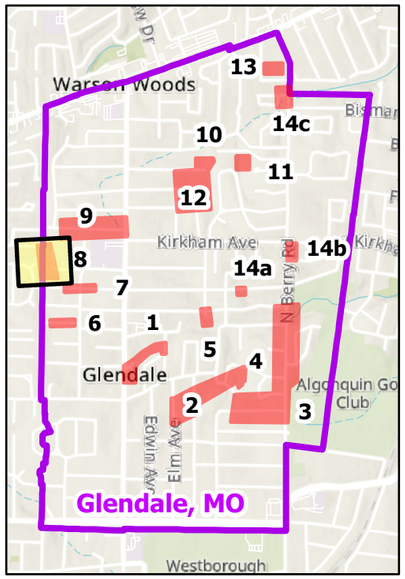
Stormwater Master Plan
Project # P007
Brownell Ave Underground Storage
Glendale, Missouri

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

Project # P008
W Oak Drive Storm Sewer Relief

Increase size of 427 linear feet of storm sewer from 36-inch to 42-inch. The project will benefit 53 properties and 7 permanent easements will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: W Oak Drive Storm Sewer Relief					
Project Number: P008					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I8000000000AI	Inlet - Area	EA	$2,050	2	$4,100
4I600000000000	Manhole - Standard Construction	LF	$335	7	$2,345
4I2000420000ST	Pipe Sewer 42" (Storm)	LF	$160	426	$68,213
3H500000000000C	Excavation	CY	$28	593	$16,596
8H4000000000BG	Sodding - Bluegrass	SY	$13	947	$12,310
				Subtotal:	**$103,564**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$3,625
8H000000000000	Protection and Restoration	LS	14%	1	$14,499
				Subtotal:	**$18,124**
			Construction Costs:		**$121,688**
	Engineering	LS	20%	1	$24,338
	Easements and Land Acquistion	LS		1	$97,600
	Contingnecy	LS	10%	1	$24,363
				Total Costs:	**$267,988**



Legend

- Manhole
- Inlet-Area
- PIPE SEWER 42 INCH (STORM)
- Sodding Bluegrass
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Basement Backups
- Sink Holes
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds

7/6/2022

0 25 50 100 150 200 Feet

N

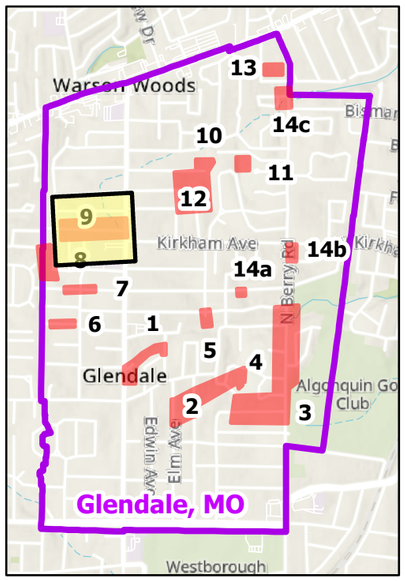
Stormwater Master Plan
Project # P008
W Oak Drive Storm Sewer Relief
Glendale, Missouri

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

Project # P009
Alexandra Ave Storm Sewer
(From Sappington Road to Glenway Drive)

Construct 1,000 LF of 24-inch storm sewer and inlets.
The project will benefit 35 properties and no permanent easement will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Alexandra Ave Storm Sewer (From Sappington Road to Glenway Drive)					
Project Number: P009					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I8000000000ST	Inlet - Street	EA	$2,050	5	$10,250
4I2000240000ST	Pipe Sewer 24" (Storm)	LF	$105	1005	$105,517
3H50000000000C	Excavation	CY	$28	933	$26,113
4I130000000000	Granular Backfill	CY	$55	911	$50,107
9D400000000000	Street Pavement - Asphaltic Concrete Rem. and Rep.	SY	$85	1442	$122,575
				Subtotal:	**$314,562**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$11,010
8H000000000000	Protection and Restoration	LS	14%	1	$44,039
				Subtotal:	**$55,048**
			Construction Costs:		**$369,611**
	Engineering	LS	20%	1	$73,922
	Contingnecy	LS	10%	1	$44,353
				Total Costs:	**$487,886**

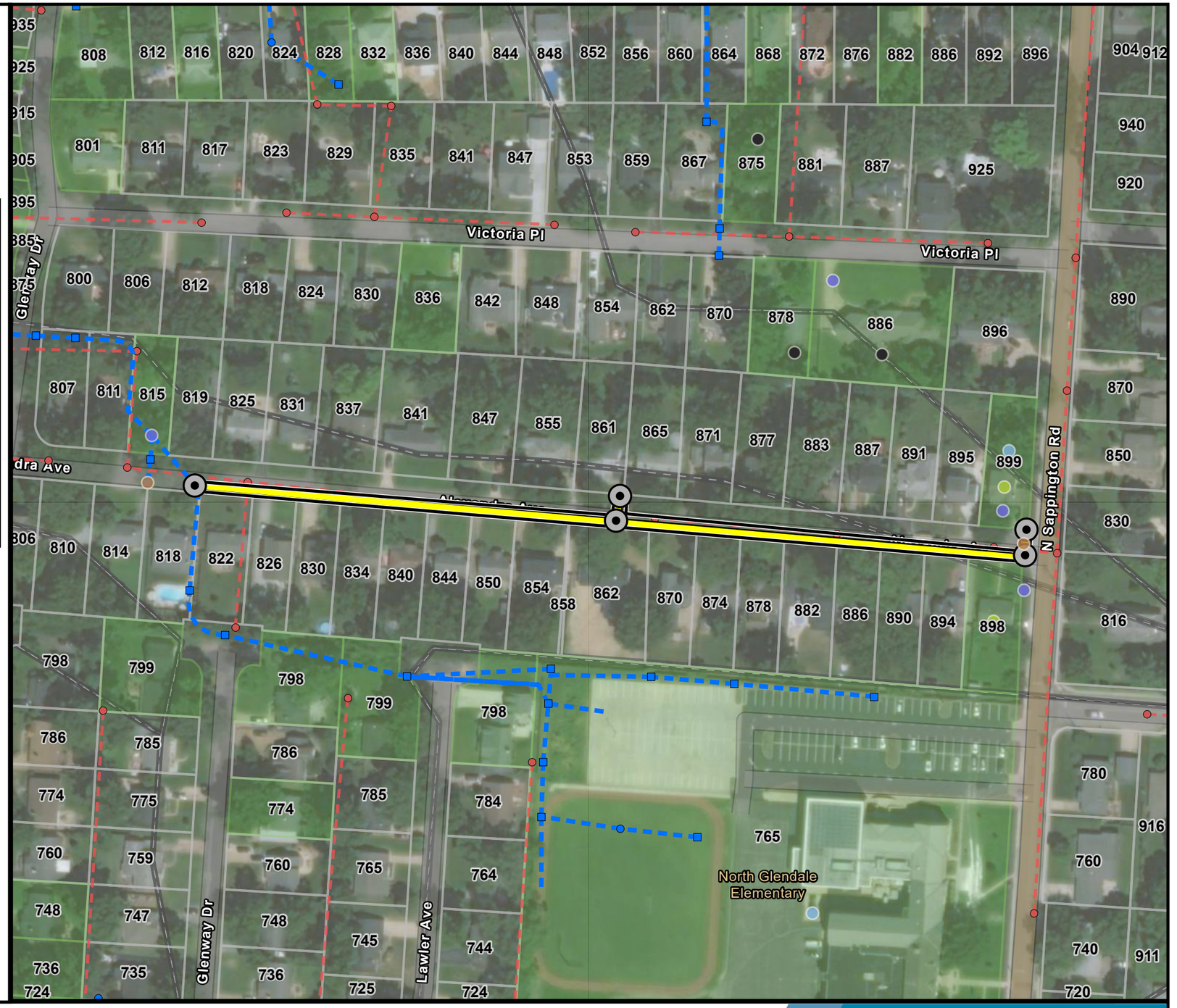


Legend

- Inlet-Street
- Street Pavement
- Pipe Sewer 24" (Storm)
- Existing Storm Water Manhole
- Existing Storm Water Inlet
- Existing Stormwater Network
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Basement Backups
- Driveway or Private Roadway Flooding
- Main Structure Building Flooding
- Public Roadway Flooding
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds



7/6/2022

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0 50 100 200 Feet

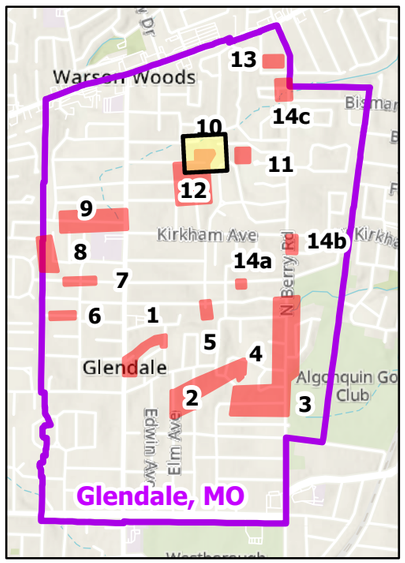
Stormwater Master Plan
Project # P009
Alexandra Ave Storm Sewer
(From Sappington Road to Glenway Drive)
Glendale, Missouri

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

Project # P010
Berrywood West Storage

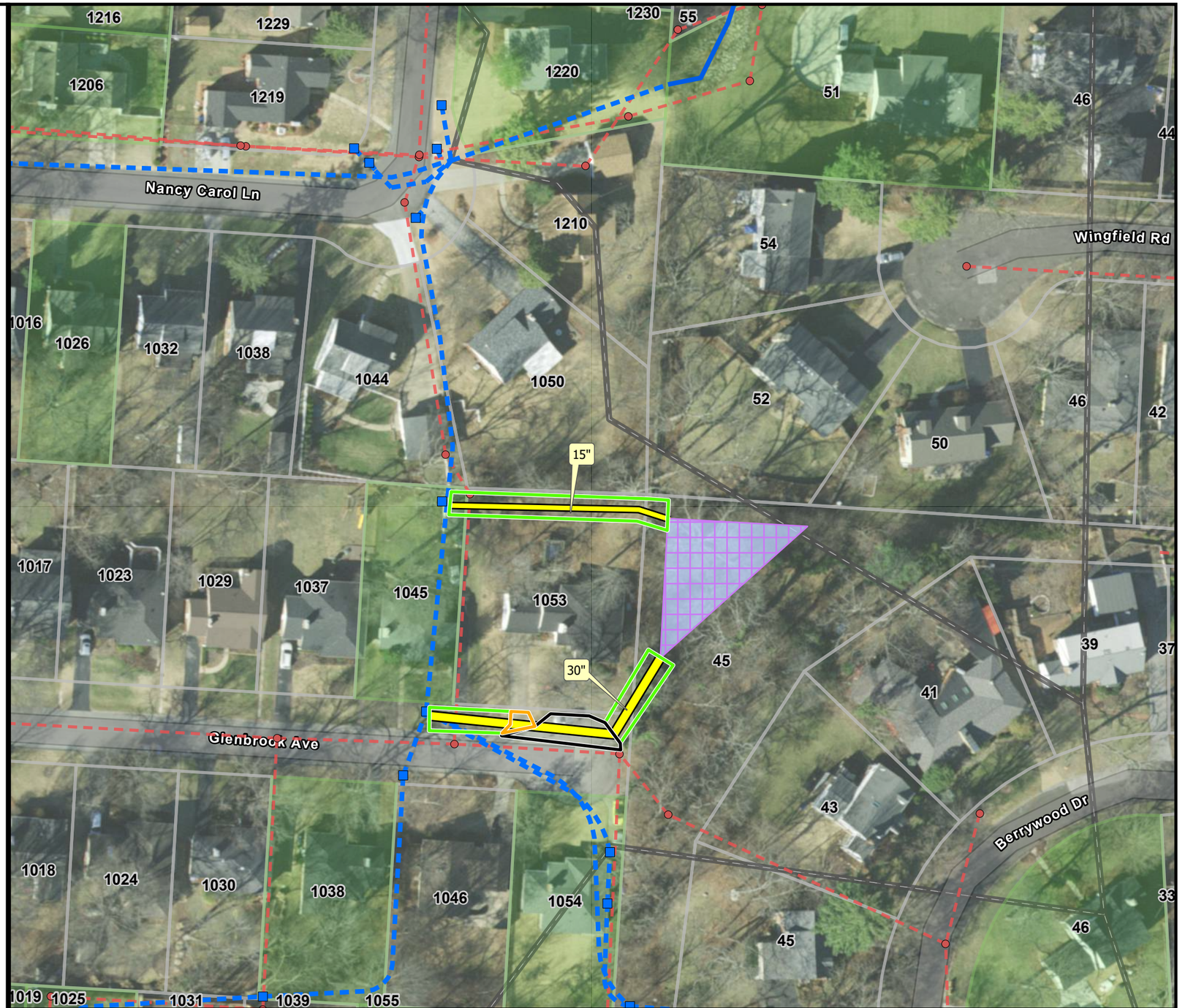
Install above ground detention storage at 43 Berry Woods Drive. The project will benefit 65 properties and 4 permanent easements will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Berrywood West Storage					
Project Number: P010					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I2000150000ST	Pipe Sewer 15" (Storm)	LF	$95	133	$12,653
4I2000300000ST	Pipe Sewer 30" (Storm)	LF	$150	166	$24,857
9K000000DETBASX	Detention Basin and Appurtenances	LS	$50,000	1	$50,000
3H50000000000C	Excavation	CY	$28	1063	$29,770
4I130000000000	Granular Backfill	CY	$55	85	$4,654
9D400000000000	Street Pavement - Asphaltic Concrete	SY	$85	94	$8,024
9D6b0000000000	Sidewalks & Driveways - Concrete Rem. And Rep.	SY	$100	16	$1,582
8H4000000000BG	Sodding - Bluegrass	SY	$13	372	$4,831
				Subtotal:	**$136,372**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$4,773
8H000000000000	Protection and Restoration	LS	14%	1	$19,092
				Subtotal:	**$23,865**
			Construction Costs:		**$160,237**
	Engineering	LS	20%	1	$32,047
	Easements and Land Acquistion	LS		1	$55,460
	Contingnecy	LS	10%	1	$24,774
				Total Costs:	**$272,519**



Legend

- PIPE SEWER 15 INCH (STORM)
- PIPE SEWER 30 INCH (STORM)
- Sodding Bluegrass
- Street Pavement
- Sidewalks & Driveways
- Detention Basin & Appurtenances
- Existing Storm Water Inlet
- Existing Stormwater Network
- Stormwater Channel
- Existing Sewer Manhole
- Existing Sanitary Sewer Network
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds



7/6/2022

0 25 50 100 Feet

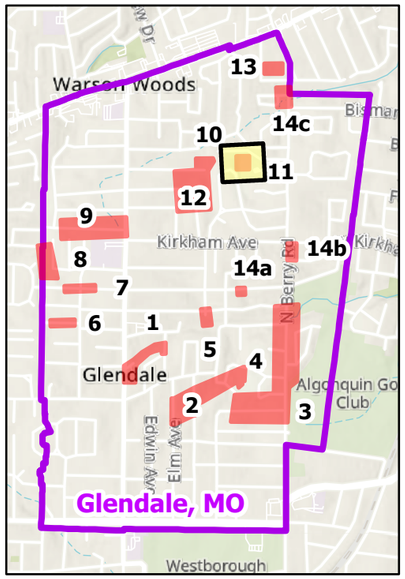
Stormwater Master Plan
Project # P010
Berrywood West Storage
Glendale, Missouri

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

Project # P011
Berrywood East Storage

Install above ground detention storage at 30 Berry Woods Drive
The project will benefit 63 properties and 1 permanent easement will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Berrywood East Storage					
Project Number: P011					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I2000150000ST	Pipe Sewer 15" (storm)	LF	$95	25	$2,338
9K000000DETBASX	Detention Basin and Appurtenances	LS	$50,000	1	$50,000
3H500000000000C	Excavation	CY	$28	1864	$52,194
8H500000000000	Seeding	SY	$3	29	$73
				Subtotal:	**$104,605**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$3,661
8H000000000000	Protection and Restoration	LS	14%	1	$14,645
				Subtotal:	**$18,306**
				Construction Costs:	**$122,911**
	Engineering	LS	20%	1	$24,582
	Easements and Land Acquistion	LS		1	$32,890
	Contingnecy	LS	10%	1	$18,038
				Total Costs:	**$198,421**



Legend

- PIPE SEWER 15 INCH (STORM)
- Detention Basin & Appurtenances
- Seeding
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Stormwater Channel
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Storm System Deteriorated
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds

7/6/2022

0 25 50 100 Feet

N

Stormwater Master Plan
Project # P011
Berrywood East Storage
Glendale, Missouri

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

Project # P012
Glenmoor Lane Stormwater Improvements

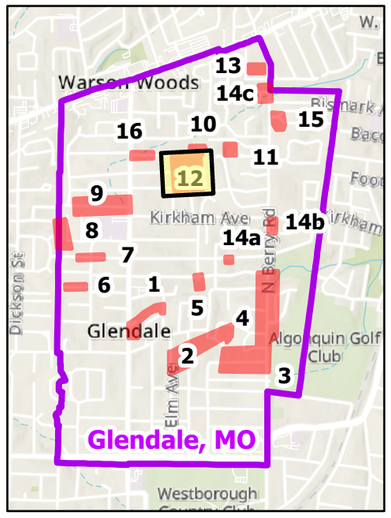
Install underground detention, add inlets to intercept flow and upsize 509 linear feet of storm sewer to a 30-inch sewer. Install swales to direct stormwater along the back of houses on the south side of Glenmoore Ave. The project will benefit 21 properties and 14 permanent easement will be required.

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

Project Name: Glenmoor Ln Stormwater Improvements

Project Number: P012

Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
4I8000000000AI	Inlet - Area	EA	$2,050	2	$4,100
4I8000000000ST	Inlet - Street	EA	$2,050	3	$6,150
4I2000300000ST	Pipe Sewer 30" (Storm)	LF	$150	509	$76,371
S1	Underground Detention	SF	$125	1492	$186,468
6J2000000000CSX	Concrete Swale	LS	$1,000	2	$2,000
3H50000000000C	Excavation	CY	$28	836	$23,395
4I130000000000	Granular Backfill	CY	$55	18	$989
9D6c000000000	Sidewalks & Driveways - Asphaltic concrete	SY	$162	16	$2,668
8H4000000000BG	Sodding - Bluegrass	SY	$13	986	$12,814
				Subtotal:	**$314,956**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$11,023
8H000000000000	Protection and Restoration	LS	14%	1	$44,094
				Subtotal:	**$55,117**
			Construction Costs:		**$370,074**
	Engineering	LS	20%	1	$74,015
	Easements and Land Acquistion	LS		1	$134,460
	Contingnecy	LS	10%	1	$57,855
				Total Costs:	**$636,403**

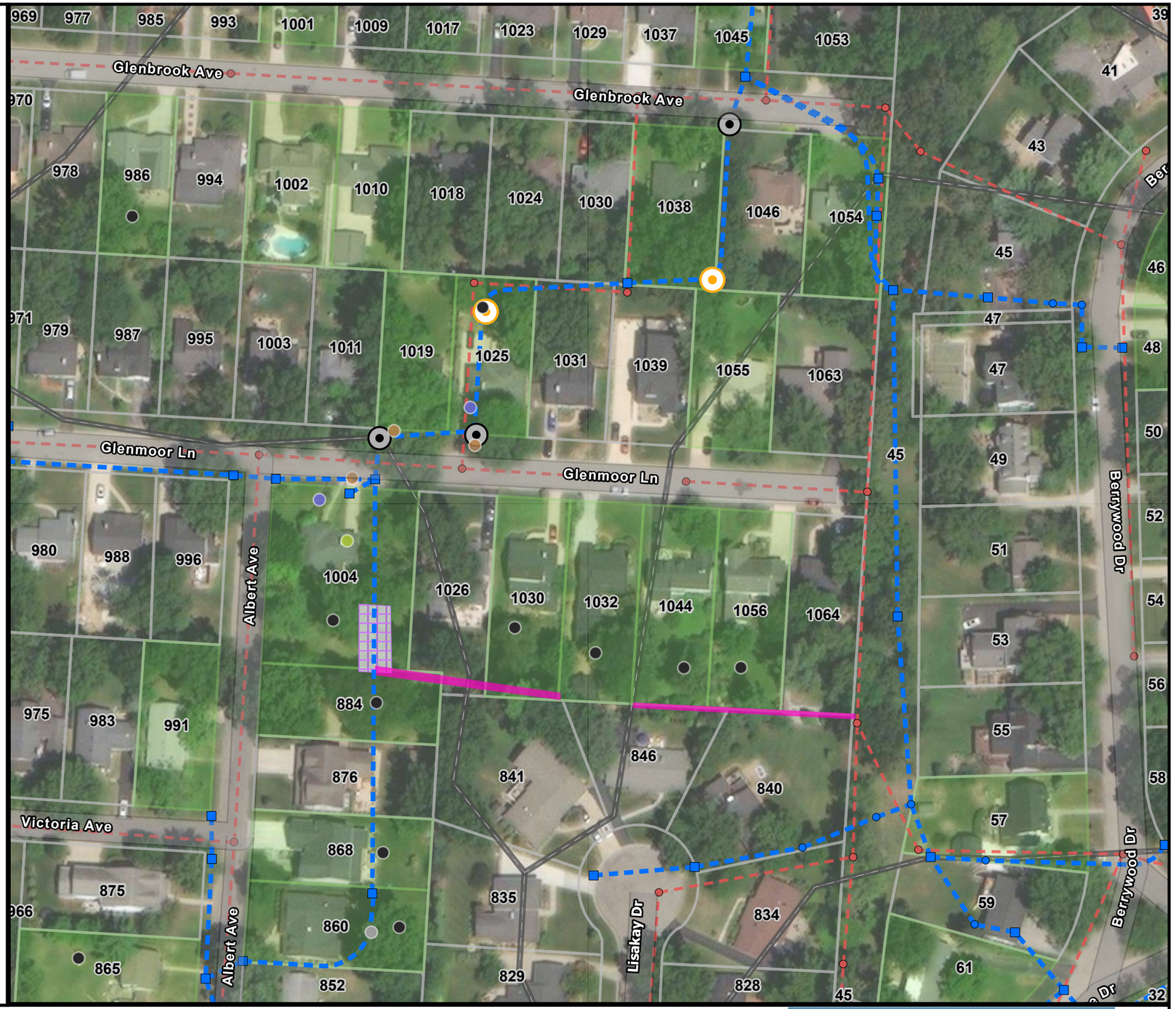


Legend

- Inlet-Area
- Inlet-Street
- Underground Detention
- Concrete Swale
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Driveway or Private Roadway Flooding
- Main Structure Building Flooding
- Public Roadway Flooding
- Sink Holes
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds



11/11/2022

0 25 50 100 150 200 Feet

N

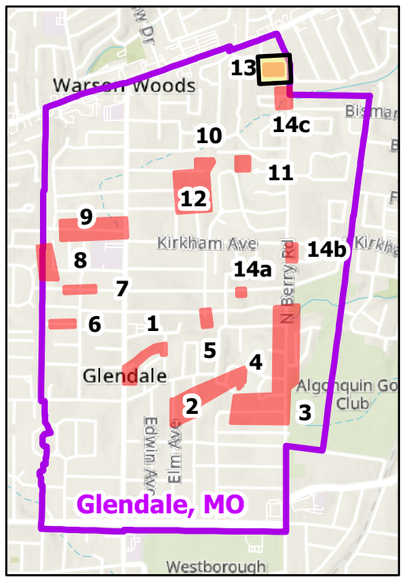
Stormwater Master Plan
Project # P012
Glenmoor Lane Stormwater Improvements
Glendale, Missouri

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

Project # P013
Madison Ave Storm Sewer Extension
(From Monier Pl to N Berry Rd)

Extend 18 inch storm sewer to the north 62 linear feet and install inlets. The project will benefit 4 properties and 2 permanent easement will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd)					
Project Number: P013					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I8000000000AI	INLET - AREA	EA	$2,050	2	$4,100
4I2000180000ST	PIPE SEWER 18 INCH (STORM)	LF	$100	61	$6,134
3H500000000000C	Excavation	CY	$28	56	$1,568
8H4000000000BG	SODDING - BLUEGRASS	SY	$13	186	$2,417
				Subtotal:	**$14,219**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$498
8H000000000000	Protection and Restoration	LS	14%	1	$1,991
				Subtotal:	**$2,488**
				Construction Costs:	**$16,707**
	Engineering	LS	20%	1	$3,341
	Permitting & Survey	LS		1	$13,500
	Easements and Land Acquisitior	LS		1	$32,300
	Contingnecy	LS	10%	1	$5,594
				Total Costs:	**$71,443**

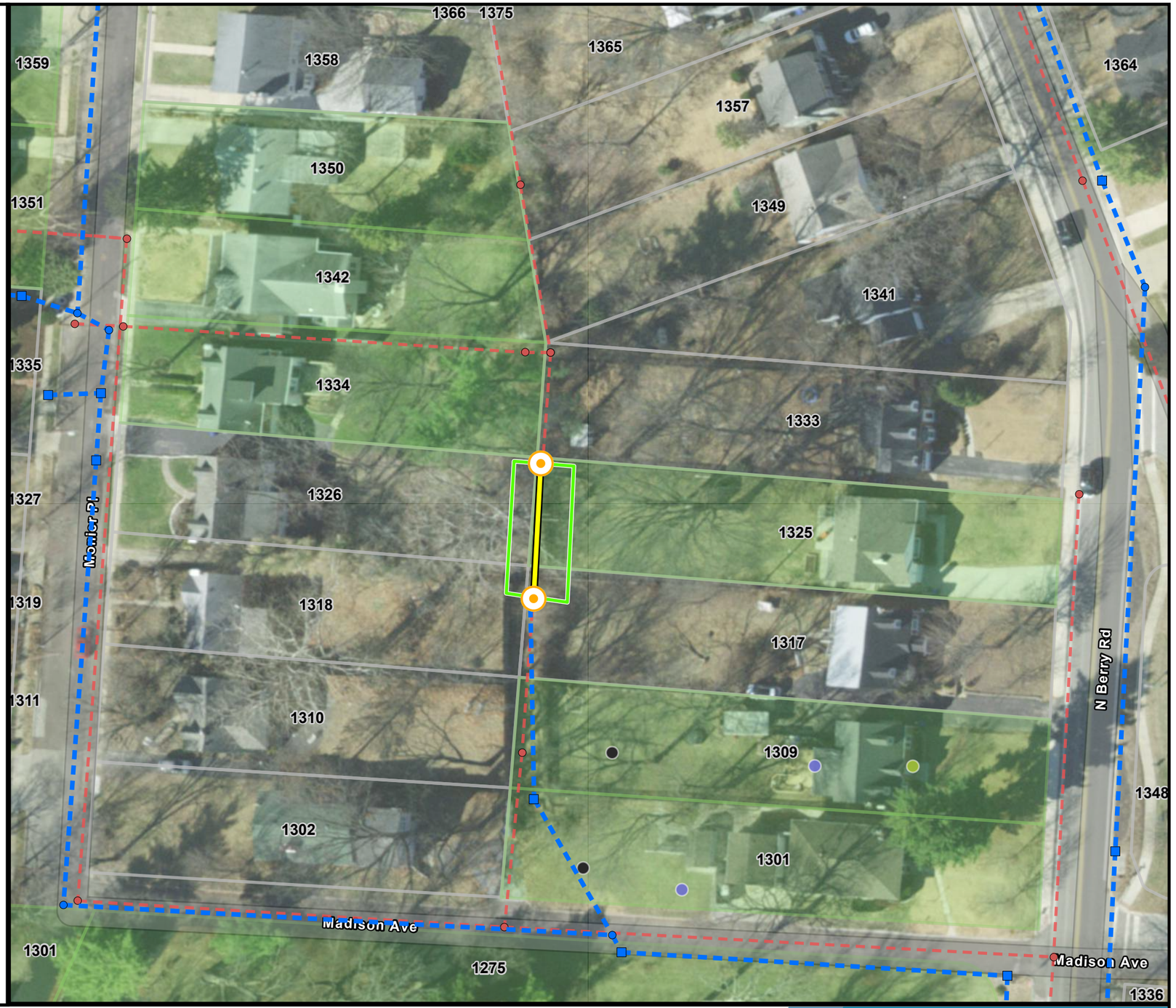


Legend

- Inlet-Area
- Sodding Bluegrass
- PIPE SEWER 18 INCH (STORM)
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Driveway or Private Roadway Flooding
- Main Structure Building Flooding
- Storm Survey Parcels, House #



7/6/2022

0 25 50 100 Feet

Stormwater Master Plan
Project # P013
Madison Ave Storm Sewer Extension
(From Monier Pl to N Berry Rd)
Glendale, Missouri

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

Project # P014
Inlet & Curb Replacement (Brownell, Glenvista, Berry Oaks)

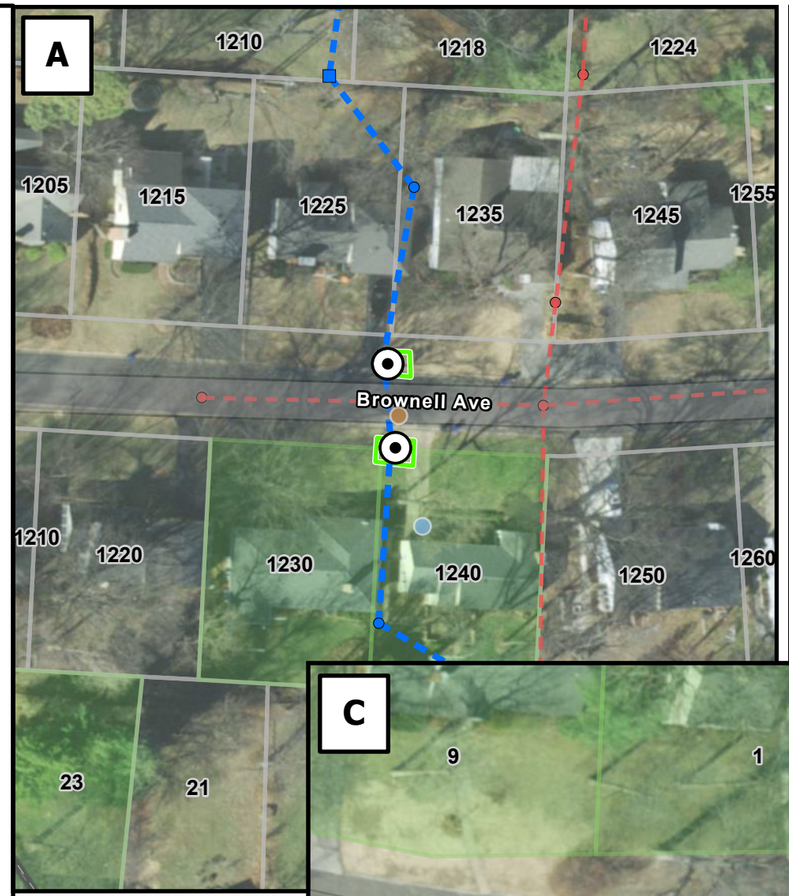
Replace 6 inlets, storm sewer improvements and adding curbs to help direct stormwater to inlets. The project will benefit 45 properties and 3 permanent easement will be required.

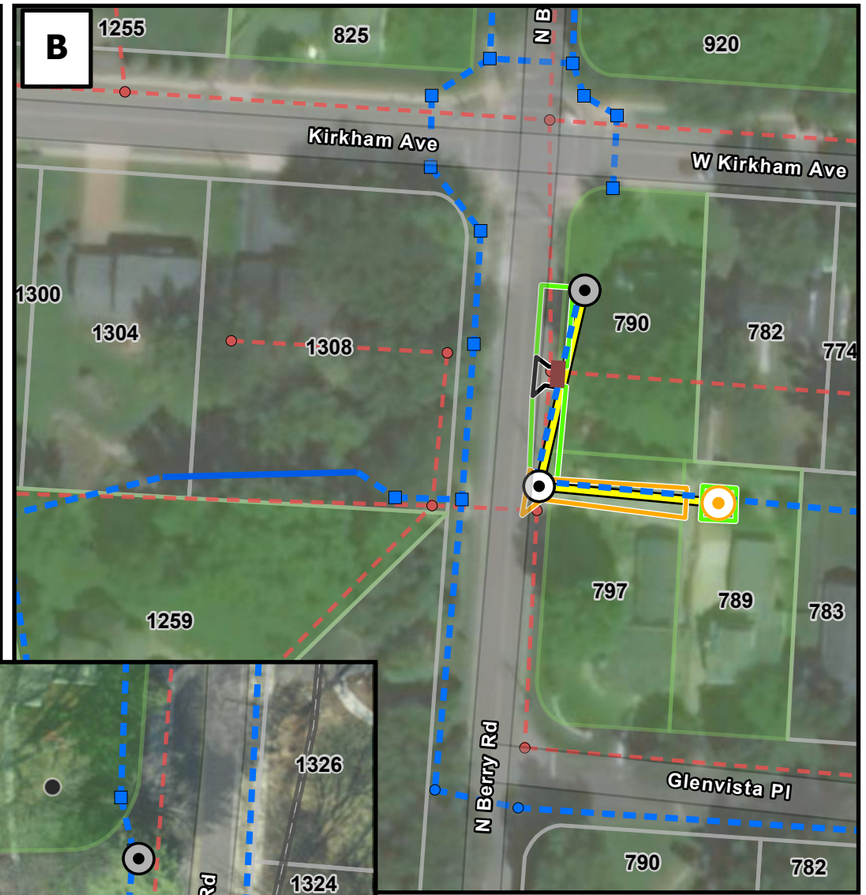
Storm Water Project Summary of Quantities and Engineer's Cost Estimate

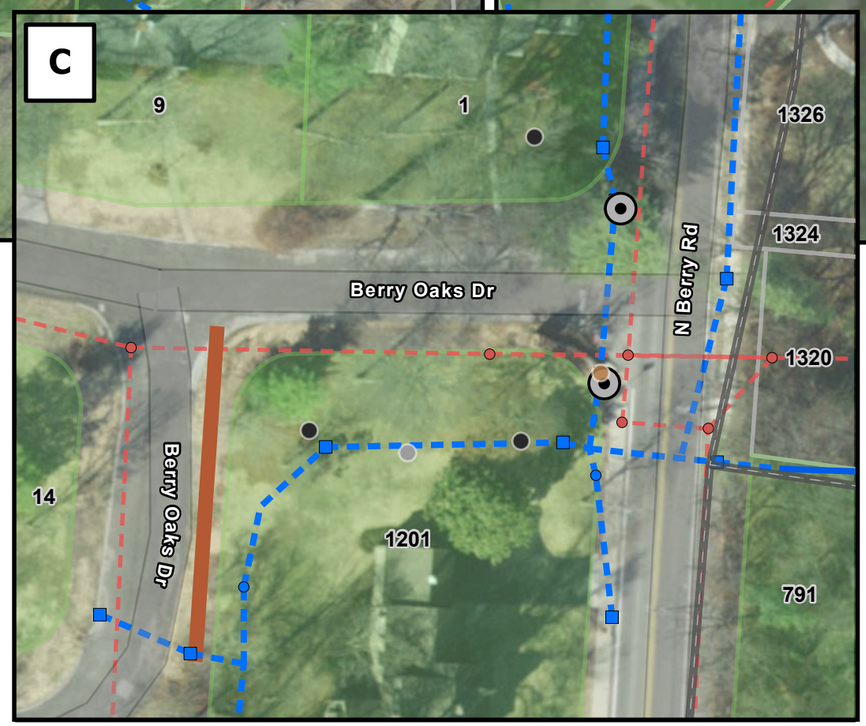
Project Name: Inlet Replacements

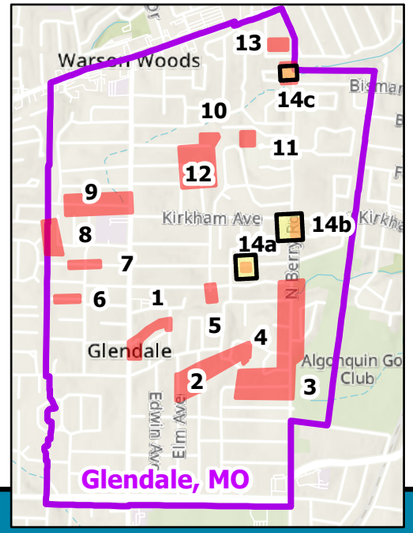
Project Number: P014

Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
4I8000000000AI	Inlet - Area	EA	$2,050	1	$2,050
4I80000000000D	Inlet - Double	EA	$3,100	3	$9,300
4I8000000000ST	Inlet - Street	EA	$2,050	3	$6,150
4I2000180000ST	Pipe Sewer 18" (storm)	LF	$100	188	$18,835
9D7000000000AC	Curb - Asphaltic Concrete	LF	$33	111	$3,652
9D70000000CNEW	Curb - Concrete	LF	$42	13	$560
3H50000000000C	Excavation	CY	$28	176	$4,915
4I1300000000000	Granular Backfill	CY	$55	39	$2,139
9D6b0000000000	Sidewalks & Driveways - Concrete	SY	$100	113	$11,286
9D6c000000000	Sidewalks & Driveways - Asphaltic Concrete	SY	$162	21	$3,331
9D400000000000	Street Pavement - Concrete	SY	$85	15	$1,232
8H4000000000BG	Sodding - Bluegrass	SY	$13	201	$2,619
				Subtotal:	**$66,069**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$2,312
8H000000000000	Protection and Restoration	LS	14%	1	$9,250
				Subtotal:	**$11,562**
			Construction Costs:		**$77,631**
	Engineering	LS	20%	1	$15,526
	Easements and Land Acquistion	LS		1	$36,470
	Contingnecy	LS	10%	1	$12,963
				Total Costs:	**$142,589**









Legend

- Inlet - Double
- Inlet-Area
- Inlet-Street
- Sodding Bluegrass
- PIPE SEWER 18 INCH (STORM)
- Curb
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Stormwater Channel
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Basement Backups
- Public Roadway Flooding
- Sink Holes
- Storm Survey Parcels, House #
- Drainage Areas and Subwatersheds

7/6/2022

0 25 50 100 Feet

N

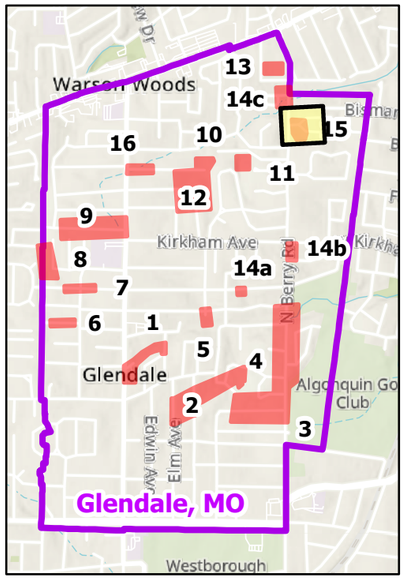
Stormwater Master Plan
Project # P014
Inlet & Curb Replacement
(Brownell, Glenvista, Berry Oaks)
Glendale, Missouri

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

Project # P015
Glenhaven Storm Sewer Relief

Construct 300 LF of 18 to 27 inch diameter storm sewer and inlets. The project will benefit 7 properties and 2 permanent easement will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Glenhaven Storm Sewer Relief					
Project Number: P015					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I8000000000AI	Inlet - Area	EA	$2,050	2	$4,100
4I80000000000D	Inlet - Street	EA	$2,050	2	$4,100
4I2000180000ST	Pipe Sewer 18" (storm)	LF	$100	254	$25,409
4I2000270000ST	Pipe Sewer 27" (storm)	LF	$150	45	$6,715
3H50000000000C	Excavation	CY	$28	258	$7,217
4I130000000000	Granular Backfill	CY	$55	241	$13,263
9D6c000000000	Sidewalks & Driveways - Asphaltic Concrete	SY	$162	41	$4,134
9D400000000000	Street Pavement - Asphaltic Concrete	SY	$85	31	$2,652
8H4000000000BG	Sodding - Bluegrass	SY	$13	600	$7,795
				Subtotal:	**$75,385**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$2,638
8H000000000000	Protection and Restoration	LS	14%	1	$10,554
				Subtotal:	**$13,192**
			Construction Costs:		**$88,578**
	Engineering	LS	20%	1	$17,716
	Easements and Land Acquistion	LS		1	$51,340
	Contingnecy	LS	10%	1	$15,763
			Total Costs:		**$173,397**



Legend

- Inlet-Area
- Inlet-Street
- Sodding Bluegrass
- Street Pavement
- Sidewalks & Driveways
- PIPE SEWER 18 INCH (STORM)
- PIPE SEWER 27 INCH (STORM)
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Public Roadway Flooding
- Sink Holes
- Storm Survey Parcels, House #

11/11/2022

0 25 50 100 Feet

N

Stormwater Master Plan
Project # P015
Glenhaven Storm Sewer Relief
Glendale, Missouri

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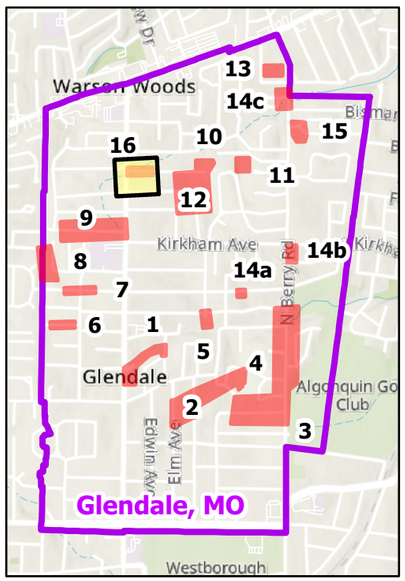
St. Louis, MO 63101

Project # P016
Glenbrook Stormwater Storage

Install underground detention system and two new inlets.
The project will benefit 14 properties and no permanent easement will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Glen Haven Storm Sewer Relief					
Project Number: P016					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I80000000000D	Inlet - Street	EA	$2,050	2	$4,100
4I2000180000ST	Pipe Sewer 15" (storm)	LF	$95	21	$2,041
4I2000270000ST	Pipe Sewer 24" (storm)	LF	$105	21	$2,226
4I2000300000ST	Pipe Sewer 30" (storm)	LF	$150	46	$6,889
S1	Underground Detention	SF	$125	3742	$467,804
3H500000000000C	Excavation	CY	$28	786	$22,004
4I130000000000	Granular Backfill	CY	$55	778	$42,766
9D400000000000	Street Pavement - Asphaltic Concrete	SY	$85	521	$44,289
8H4000000000BG	Sodding - Bluegrass	SY	$13	105	$1,370
				Subtotal:	**$593,489**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$20,772
8H000000000000	Protection and Restoration	LS	14%	1	$83,088
				Subtotal:	**$103,861**
			Construction Costs:		**$697,349**
	Engineering	LS	20%	1	$139,470
	Easements and Land Acquistion	LS		1	$18,120
	Contingnecy	LS	10%	1	$83,682
			Total Costs:		**$938,621**

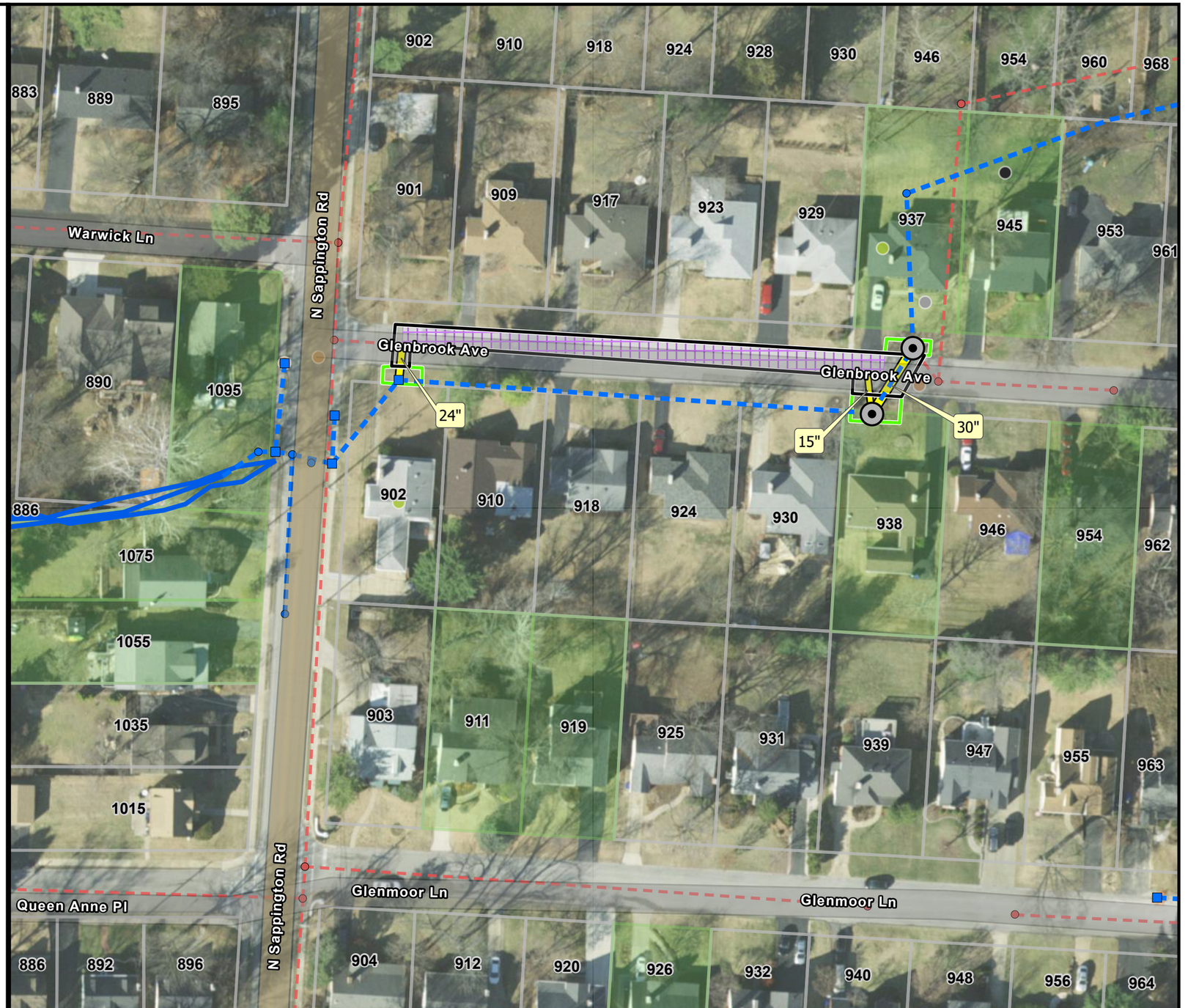


Legend

- Inlet-Street
- Sodding Bluegrass
- Street Pavement
- Pipe Sewer 15 Inch (Storm)
- Pipe Sewer 24 Inch (Storm)
- Pipe Sewer 30 Inch (Storm)
- Underground Detention
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Stormwater Channel
- Existing Sewer Manhole
- Existing Sanitary Sewer Network

Problem Identification (PID)

- Backyard Flooding
- Main Structure Building Flooding
- Public Roadway Flooding
- Sink Holes
- Storm Survey Parcels, House #



11/11/2022

0 25 50 100 Feet

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Stormwater Master Plan
Project # P016
Glenbrook Stormwater Storage
Glendale, Missouri

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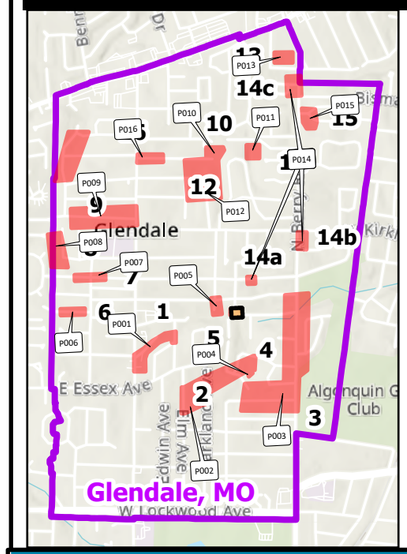
St. Louis, MO 63101

Project # P017
Clif Side Dr Storm Sewer

Install 135 LF of a 14 ft x 4.5 ft box culvert to replace the existing 54 in storm sewer. The project will benefit one property and one permanent easement will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Clif Side Dr Storm Sewer					
Project Number: P017					
Pay Item	**Item Description**	**Unit**	**Unit Cost**	**Quantity**	**Extended Cost**
4I600000000000	Manhole	LF	$335	28	$9,380
4I80000000000D	Inlet - Street	EA	$2,050	2	$4,100
6J300012004BOX	Box Culvert - Reinf. Concrete 14 FT. X 04 FT.	LF	$1,800	135	$243,000
4I2000120000ST	Pipe Sewer 12 Inch (Storm)	LF	$90	26	$2,340
4I2000080000SC	Pipe Sewer 08 Inch (Sanitary)	LF	$120	82	$9,840
3H50000000000C	Excavation	CY	$28	1138	$31,873
4I130000000000	Granular Backfill	CY	$55	78	$4,278
9D5c0000000000	Street Pvmt - Asphl Conc Surf & Righd Base - Rem & Rep	SY	$95	61	$5,784
	Headwall demolition	EA	$5,000	2	$10,000
9E10000000HSLSX	Reinforced Concrete Headwall & Spillway	EA	$5,500	2	$11,000
9D70000000000C	Curb - Concrete Rem. and Rep.	LF	$50	50	$2,500
8H4000000000BG	Sodding - Bluegrass	SY	$13	233	$1,370
				Subtotal:	**$335,465**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$11,741
8H000000000000	Protection and Restoration	LS	14%	1	$46,965
				Subtotal:	**$58,706**
			Construction Costs:		**$394,172**
	Engineering	LS	20%	1	$78,834
	Easements and Land Acquistion	LS		1	$18,120
	Contingnecy	LS	10%	1	$47,301
			Total Costs:		**$539,000**



Legend

- Manhole
- Inlet-Street
- Street Pavement
- Pipe Sewer 12 Inch (Storm)
- Concrete Box Culvert
- New Sanitary Sewers
- Curb - Concrete
- Existing Storm Water Inlet
- Existing Stormwater Network
- Stormwater Channel
- Existing Sanitary Sewer Network

12/26/2024

0 25 50

Stormwater Master Plan
Project # P017
Clif Side Dr Storm Sewer
Glendale, Missouri

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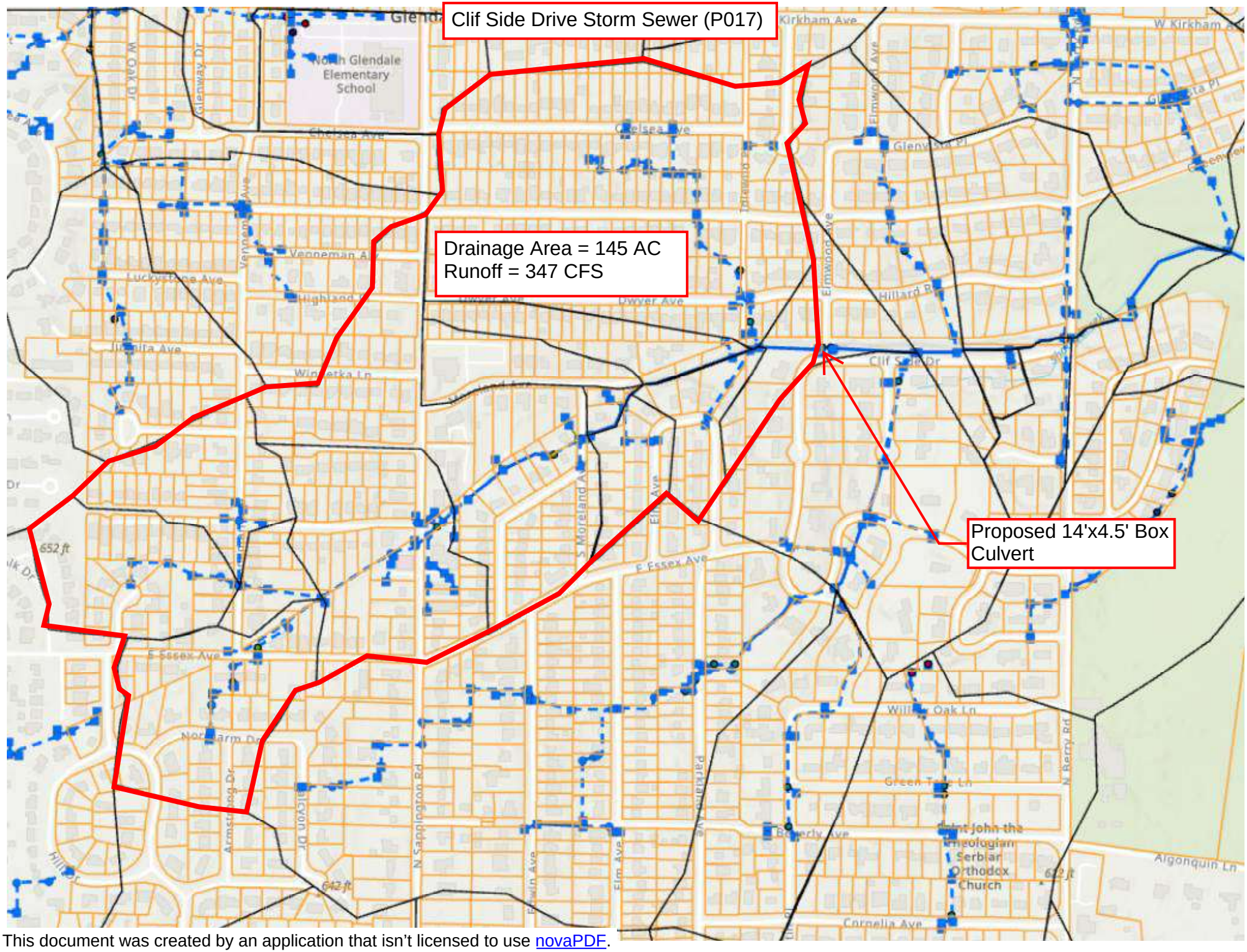
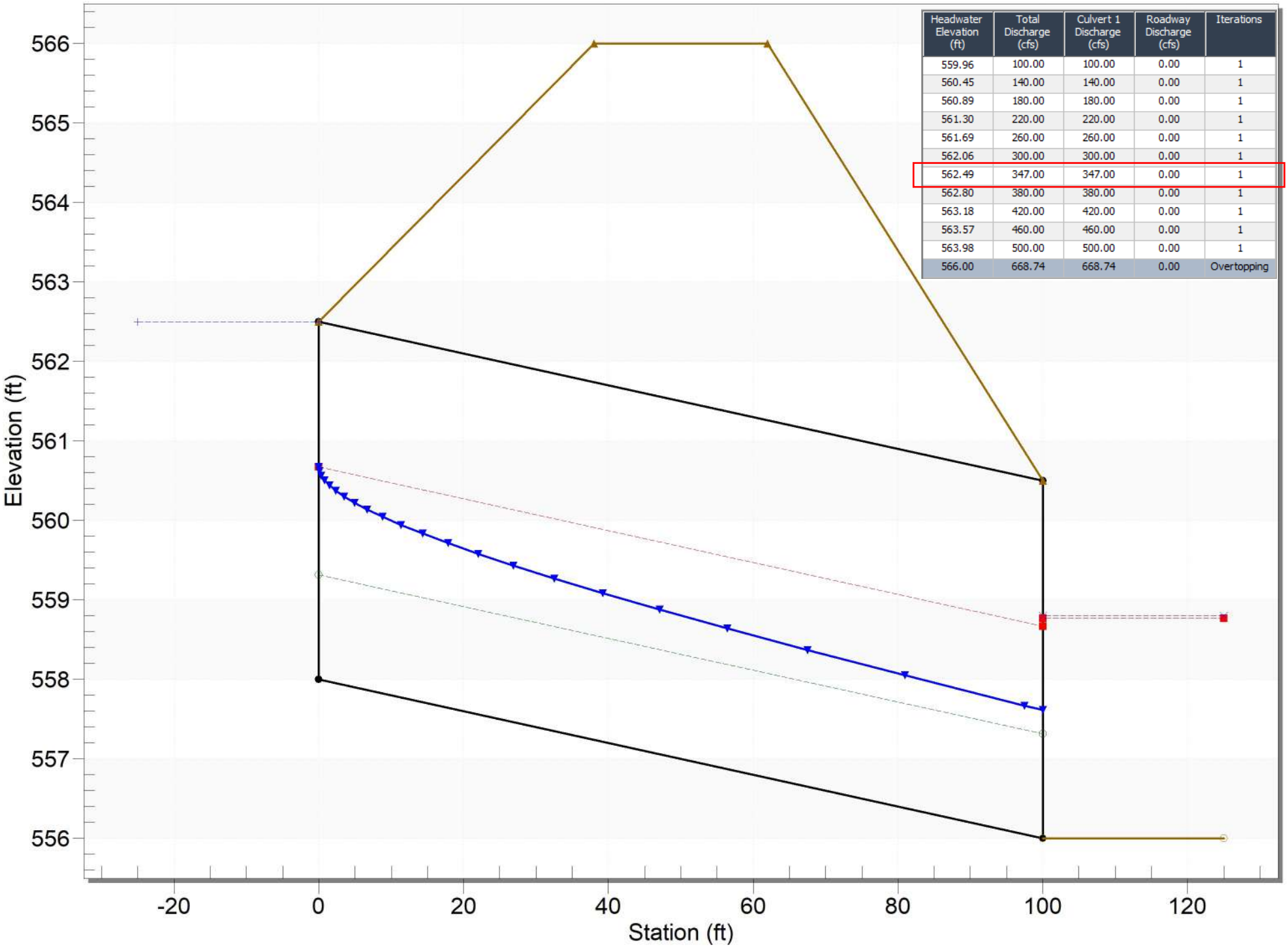


14'x4.5' Box Culvert

Culvert - Culvert 1, Culvert Discharge - 347.0 cfs

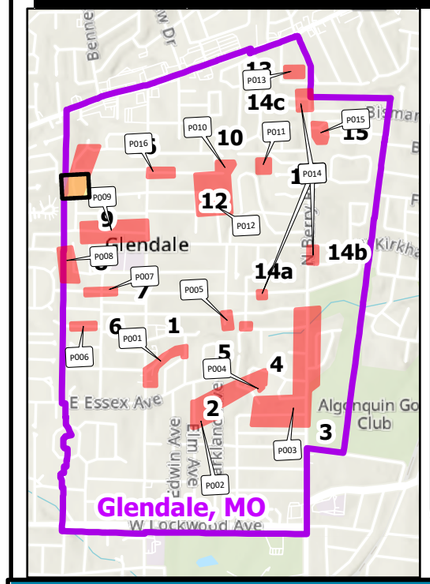


Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
559.96	100.00	100.00	0.00	1
560.45	140.00	140.00	0.00	1
560.89	180.00	180.00	0.00	1
561.30	220.00	220.00	0.00	1
561.69	260.00	260.00	0.00	1
562.06	300.00	300.00	0.00	1
562.49	347.00	347.00	0.00	1
562.80	380.00	380.00	0.00	1
563.18	420.00	420.00	0.00	1
563.57	460.00	460.00	0.00	1
563.98	500.00	500.00	0.00	1
566.00	668.74	668.74	0.00	Overtopping

Project # P018
Glenway Dr Storm Sewer Improvements

Replace 96 in x 48 in reinforced concrete box with a 72 in x 72 in reinforced concrete box. Remove and replace two single inlets with double inlets. The project will benefit twelve properties and three permanent easements will be required.

Storm Water Project Summary of Quantities and Engineer's Cost Estimate					
Project Name: Glenway Dr Storm Sewer Improvements					
Project Number: P018					
Pay Item	Item Description	Unit	Unit Cost	Quantity	Extended Cost
4I80000000000D	Inlet - Double	EA	$3,100	2	$6,200
3H50000000000C	Excavation	CY	$28	91	$2,542
4I130000000000	Granular Backfill	CY	$55	82	$4,494
9D5c0000000000	Street Pvmt - Asphl Conc Surf & Righd Base - Rem & Rep	SY	$95	278	$26,389
	Abandon Existing RCB	LS	$50,000	1	$50,000
4I100000000JCS	Junction Chamber - Reinforced Concrete	EA	$30,000	2	$60,000
6J300006006BOX	Box Culvert - Reinf. Concrete 06 ft. X 06 ft.	LF	$735	252	$185,220
9D70000000000C	Curb - Concrete Rem. and Rep.	LF	$50	200	$10,000
8H4000000000BG	Sodding - Bluegrass	SY	$13	267	$1,370
				Subtotal:	**$346,214**
1G6a0000000MOBX	Mobilization	LS	3.5%	1	$12,117
8H000000000000	Protection and Restoration	LS	14%	1	$48,470
				Subtotal:	**$60,587**
			Construction Costs:		**$406,801**
	Engineering	LS	20%	1	$81,360
	Easements and Land Acquistion	LS		1	$36,000
	Contingnecy	LS	10%	1	$48,816
			Total Costs:		**$573,000**

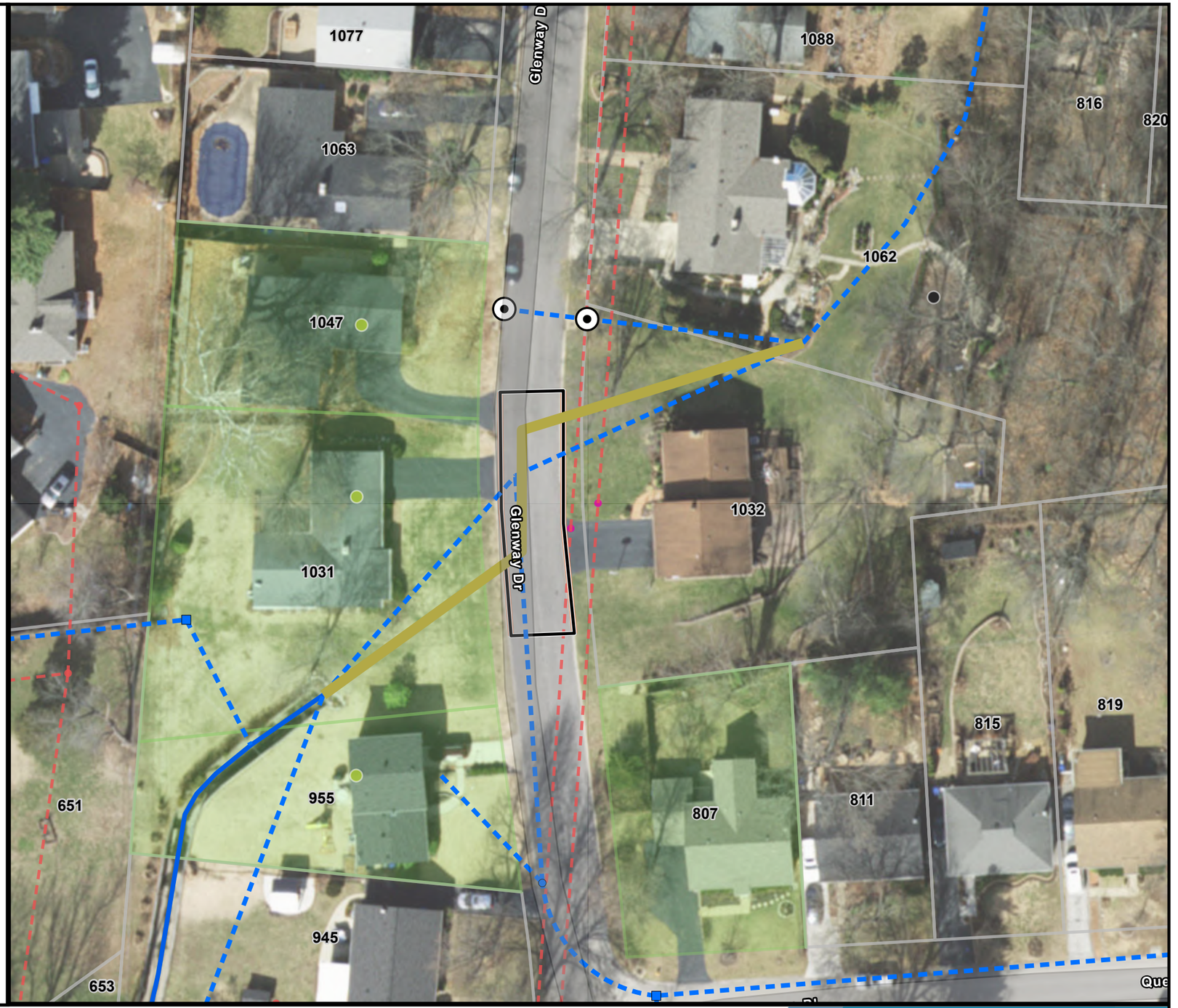


Legend

- Inlet - Double
- Street Pavement
- 72 IN x 72 IN RCB
- CURB - CONCRETE REM. AND REP.
- Existing Storm Water Inlet
- Existing Storm Water Manhole
- Existing Stormwater Network
- Stormwater Channel
- Existing Sanitary Sewer Network

Sanitary Sewer Network - SsManhole

- Line Manhole
- Drop Manhole



12/26/2024

0 25 50 100 Feet

N

Stormwater Master Plan
Project # P018
Glenway Dr Storm Sewer Improvements
Glendale, Missouri

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APPENDIX F: BENEFIT/COST RATIO EVALUATION

Benefit/Cost Ratio

Project Name: Edwin Ave Storm Sewer (From Sappington Rd to S Moreland Ave)

Project Number: P001

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	1	300	300
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	3	100	300
	Public Property			
	Roadway	3	300	900

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	1	100	100
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	3	300	900
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	3	200	600

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

Benefit Score:	3600
Cost:	$2,068,030
Benefit/Cost Ratio:	1.741

Benefit/Cost Ratio

Project Name: Willow Oak Diversion Sewer

Project Number: P003

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	0	300	0
	Risk to garage	2	200	400
	Risk to driveway	1	100	100
	Risk to yard	3	100	300
	Public Property			
	Roadway	0	300	0

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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:	$5,640,729
Benefit/Cost Ratio:	0.372

Benefit/Cost Ratio

Project Name: Parkland, Elm and Edwin Stormwater Storage

Project Number: P002

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	3	300	900
	Risk to garage	3	200	600
	Risk to driveway	3	100	300
	Risk to yard	3	100	300
	Public Property			
	Roadway	3	300	900

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 Houses = 1

Safety	Existing Safety Risk in Project Area (Risk to human life)	3	300	900
	Resiliency (Impacted emergency vehicle access, public transportation access, school bus access etc.)	3	200	600

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

Benefit Score:	6000
Cost:	$8,328,241
Benefit/Cost Ratio:	0.720

Benefit/Cost Ratio

Project Name: Devon Rd Creek Stabilization

Project Number: P004

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

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

Erosion	Private Property			
	Risk to house	2	300	600
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	3	100	300
	Public Property			
	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	0	500	0

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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:	1200
Cost:	$55,835
Benefit/Cost Ratio:	21.49

Benefit/Cost Ratio

Project Name: Idlewild Ln Storm Sewer Relief (From Hillard Rd to Dwyer Ave)

Project Number: P005

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	1	100	100
	Public Property			
	Roadway	3	300	900

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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.)	1	200	200

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

Benefit Score:	3000
Cost:	$114,211
Benefit/Cost Ratio:	26.27

Benefit/Cost Ratio

Project Name: Juanita Ave Underground Storage

Project Number: P006

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

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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.)	1	200	200

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

Benefit Score:	2400
Cost:	$1,042,235
Benefit/Cost Ratio:	2.30

Benefit/Cost Ratio

Project Name: Brownell Ave Underground Storage

Project Number: P007

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	3	300	900
	Risk to garage	1	200	200
	Risk to driveway	2	100	200
	Risk to yard	3	100	300
	Public Property			
	Roadway	3	300	900

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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.)	1	200	200

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

Benefit Score:	4000
Cost:	$2,128,553
Benefit/Cost Ratio:	1.88

Benefit/Cost Ratio

Project Name: W Oak Drive Storm Sewer Relief

Project Number: P008

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	3	300	900
	Risk to garage	2	200	400
	Risk to driveway	2	100	200
	Risk to yard	3	100	300
	Public Property			
	Roadway	2	300	600

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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.)	1	200	200

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

Benefit Score:	4400
Cost:	$267,988
Benefit/Cost Ratio:	16.42

Benefit/Cost Ratio

Project Name: Alexandra Ave Storm Sewer (From Sappington Road to Glenway Drive)

Project Number: P009

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	2	300	600
	Risk to garage	2	200	400
	Risk to driveway	3	100	300
	Risk to yard	3	100	300
	Public Property			
	Roadway	3	300	900

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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.)	2	200	400

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

Benefit Score:	4200
Cost:	$487,886
Benefit/Cost Ratio:	8.61

Benefit/Cost Ratio

Project Name: Berrywood West Storage

Project Number: P010

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

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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.)	1	200	200

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

Benefit Score:	2300
Cost:	$272,519
Benefit/Cost Ratio:	8.44

Benefit/Cost Ratio

Project Name: Berrywood East Storage

Project Number: P011

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

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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.)	1	200	200

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

Benefit Score:	2300
Cost:	$198,421
Benefit/Cost Ratio:	11.59

Benefit/Cost Ratio

Project Name: Glenmoor Ln Stormwater Improvements

Project Number: P012

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	3	300	900
	Risk to garage	3	200	600
	Risk to driveway	3	100	300
	Risk to yard	3	100	300
	Public Property			
	Roadway	2	300	600

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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:	4500
Cost:	$636,403
Benefit/Cost Ratio:	7.07

Benefit/Cost Ratio

Project Name: Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd)

Project Number: P013

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

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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.)	1	200	200

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

Benefit Score:	1700
Cost:	$71,443
Benefit/Cost Ratio:	23.80

Benefit/Cost Ratio

Project Name: Inlet & Curb Replacements (Brownell, Glenvista, Berry Oaks)

Project Number: P014

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

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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:	$142,589
Benefit/Cost Ratio:	14.73

Benefit/Cost Ratio

Project Name: Glenhaven Storm Sewer Relief

Project Number: P015

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

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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.)	1	200	200

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

Benefit Score:	2800
Cost:	$173,397
Benefit/Cost Ratio:	16.15

Benefit/Cost Ratio

Project Name: Glenbrook Stormwater Storage

Project Number: P016

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	3	300	900
	Risk to garage	2	200	400
	Risk to driveway	2	100	200
	Risk to yard	3	100	300
	Public Property			
	Roadway	2	300	600

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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:	3400
Cost:	$938,621
Benefit/Cost Ratio:	3.62

Benefit/Cost Ratio

Project Name: Clif Side Dr Storm Sewer

Project Number: P017

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

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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:	2000
Cost:	$539,000
Benefit/Cost Ratio:	3.71

Benefit/Cost Ratio

Project Name: Glenway Dr Storm Sewer Improvements

Project Number: P018

		Score	Weight	Total
Flooding	Private Property			
	Risk to house	3	300	900
	Risk to garage	3	200	600
	Risk to driveway	2	100	200
	Risk to yard	3	100	300
	Public Property			
	Roadway	2	300	600

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

Erosion	Private Property			
	Risk to house	0	300	0
	Risk to garage	0	200	0
	Risk to driveway	0	100	0
	Risk to yard	0	100	0
	Public Property			
	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	12	500	6000

Score: >50 Houses = 3, 10-49 Houses = 2, < 9 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:	8600
Cost:	$573,000
Benefit/Cost Ratio:	15.01

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Edwin Ave (From Sappington Rd to S Moreland Ave) (P001) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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	1	50		8		100
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50	3	25		4		150
		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	8	5		0		80
		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	1	5		1		10
	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		

PROJECT NAME: Edwin Ave (From Sappington Rd to S Moreland Ave) (P001) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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**						**340**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Edwin Ave (From Sappington Rd to S Moreland Ave) (P001) DATE: 12/16/2022

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	12%		Max points:	1000	120
	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	**140**
						TOTAL BENEFIT POINTS	**480**

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

TOTAL COST IN THOUSANDS= **2068**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.23**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Parkland, Elm and Algonquin Stormwater Storage (P002) DATE: 12/16/2022

		PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Parkland, Elm and Algonquin Stormwater Storage (P002) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	2.1.1. Structure Flooding							
		Habitable 1st floor, residential; includes spaces with mechanical equipment (1 lot per structure)* *Address:*	350		250		65	2	130
		Basement (1 lot per structure)* *Address:*	250		200	3	50		600
		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	3	75		25		300
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50	1	35		12		50
		Yard Flooding (1 per lot) *Address:*	10	12	6		0		120
		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	3	6		1		30
		Ponding (per ponding area) *Address:*	No. Ponds:		3	Points/pond:		5	15
	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**						**1345**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Parkland, Elm and Algonquin Stormwater Storage (P002) DATE: 12/16/2022

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	30%	Max points:	1000	300
	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	**320**
					TOTAL BENEFIT POINTS	**1665**

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

TOTAL COST IN THOUSANDS= **8328**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.20**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Willow Oak Diversion Sewer (P003) DATE: 12/16/2022

		PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Willow Oak Diversion Sewer (P003) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	1	50		200
		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	1	75		25		100
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50	1	35		12		50
		Yard Flooding (1 per lot) *Address:*	10	3	6		0		30
		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	0	150		25		
		Traffic obstruction (> 6" of water) on arterial street *Address:*	50	0	35		6		
		Traffic obstruction (> 6" of water) on collector street *Address:*	25	0	15		2		
		Traffic obstruction (> 6" of water) on residential street *Address:*	10	0	6		1		
		Ponding (per ponding area) *Address:*	No. Ponds:		2	Points/pond:		5	10
	2.2.	Moderate Risk Erosion of misc. structures *Address:*	No. Lots:		0	Points/lot:		20	
	2.3.	Yard Erosion (1 per lot) *Address:*	No. Lots:		0	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**						**440**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Willow Oak Diversion Sewer (P003) DATE: 12/16/2022

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	80%	Max points:	1000	800
	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	**820**
					TOTAL BENEFIT POINTS	**1260**

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

TOTAL COST IN THOUSANDS= **5640**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.22**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Devon Rd Creek Stabilization (P004) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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	1	50		200
		Misc structures including pools, patio/decks, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	150		100	1	25		100
		Industrial, office, commercial and warehouse (1 lot per structure) *Address:*	300		200	0	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	0	12		
		Collector Road: *Address:*	35		25	0	6		
		Residential Road: *Address:*	20		12	0	3		

PROJECT NAME: Devon Rd Creek Stabilization (P004) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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: Devon Rd Creek Stabilization (P004) DATE: 12/16/2022

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	**330**

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

TOTAL COST IN THOUSANDS= **55**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **6.00**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Idlewild Ln (From Hillard Rd to Dwyer Ave) Storm Sewer Relief (P005) DATE: 12/16/2022

		PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Idlewild Ln (From Hillard Rd to Dwyer Ave) Storm Sewer Relief (P005) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	1	50		200
		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	1	12		35
		Yard Flooding (1 per lot) *Address:*	10		6	3	0		18
		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	57	6		1		570
		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**						**873**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Idlewild Ln (From Hillard Rd to Dwyer Ave) Storm Sewer Relief (P005) DATE: 12/16/2022

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	**893**

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

TOTAL COST IN THOUSANDS= **114**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **7.83**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Juanita Ave Underground Storage (P006) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Juanita Ave Underground Storage (P006) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	2	75		25		200
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50	1	35		12		50
		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		
		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:		2	Points/pond:		5	10
	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					0		
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: Juanita Ave Underground Storage (P006) DATE: 12/16/2022

CONTINUED:

	SOLUTION BENEFIT CATEGORY					
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	36%	Max points:	1000	360
	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	**380**
					TOTAL BENEFIT POINTS	**690**

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

TOTAL COST IN THOUSANDS= **1041**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.66**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Brownell Ave Underground Storage (P007) DATE: 12/16/2022

		PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Brownell Ave Underground Storage (P007) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	1	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	1	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	3	6		0		30
		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**						**105**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Brownell Ave Underground Storage (P007) DATE: 12/16/2022

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	39%	Max points:	1000	390
	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	**390**
					TOTAL BENEFIT POINTS	**495**

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

TOTAL COST IN THOUSANDS= **2128**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.23**

Place "X" in one box below:

☐ **MSD Project**
☐ **Project by Others**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: W Oak Drive Storm Sewer Relief (P008) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: W Oak Drive Storm Sewer Relief (P008) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	2	50		400
		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	1	35		12		50
		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							
Note: Problem points are awarded only for those problems solved by the proposed solution.			**TOTAL PROBLEM POINTS**						**540**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: W Oak Drive Storm Sewer Relief (P008) DATE: 12/16/2022

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	**560**

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

TOTAL COST IN THOUSANDS= **267**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **2.10**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Alexandra Ave Storm Sewer (P009) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Alexandra Ave Storm Sewer (P009) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	1	75		25		100
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50	1	35		12		50
		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	13	6		1		130
		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**						**300**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Alexandra Ave Storm Sewer (P009) DATE: 12/16/2022

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	**320**

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

TOTAL COST IN THOUSANDS= **487**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.66**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Berrywood West Storage (P010) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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	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	9	5		1		90
	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		

PROJECT NAME: Berrywood West Storage (P010) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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**						**150**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Berrywood West Storage (P010) DATE: 12/16/2022

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	25%	Max points:	1000	250
	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	**270**
					TOTAL BENEFIT POINTS	**420**

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

TOTAL COST IN THOUSANDS= **272**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **1.54**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Berrywood East Storage (P011) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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	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	9	5		1		90
	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		

PROJECT NAME: Berrywood East Storage (P011) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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**						**150**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Berrywood East Storage (P011) DATE: 12/16/2022

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	25%	Max points:	1000	250
	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	**270**
					TOTAL BENEFIT POINTS	**420**

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

TOTAL COST IN THOUSANDS= **198**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **2.12**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Glenmoor Lane Stormwater Improvements (P012) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Glenmoor Lane Stormwater Improvements (P012) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	1	200		50		250
		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	1	75		25		100
		Misc. structures including patio/decks, pools, sheds, tennis courts, detached garages, etc.(1 lot per structure) *Address:*	50	1	35		12		50
		Yard Flooding (1 per lot) *Address:*	10	10	6		0		100
		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			15				15
Note: Problem points are awarded only for those problems solved by the proposed solution.			**TOTAL PROBLEM POINTS**						**565**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Glenmoor Lane Stormwater Improvements (P012) DATE: 12/16/2022

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	6%		Max points:	1000	60
	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	0	5
	5.2. Recreational/Educational	Yes = 100, no = 0 pts					
						TOTAL SOLUTION POINTS	**65**
						TOTAL BENEFIT POINTS	**630**

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

TOTAL COST IN THOUSANDS= **636**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.99**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd) (P013) DATE: 12/16/2022

		PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd) (P013) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	1	35		12		50
		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**						**70**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd) (P013) DATE: 12/16/2022

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	**70**

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

TOTAL COST IN THOUSANDS= **71**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.99**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Inlet & Curb Replacements (Brownell, Glenvista, Berry Oaks) (P014) DATE: 12/16/2022

		PROBLEM SOLVED CATEGORY 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	
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: Inlet & Curb Replacements (Brownell, Glenvista, Berry Oaks) (P014) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	3	50		600
		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	1	75		25		100
		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	6		0		60
		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**						**810**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Inlet & Curb Replacements (Brownell, Glenvista, Berry Oaks) (P014) DATE: 12/16/2022

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:	2		Points per Add'l Proj.:	50	100
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	**120**
						TOTAL BENEFIT POINTS	**930**

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

TOTAL COST IN THOUSANDS= **142**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **6.55**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Glenhaven Storm Sewer Relief (P015) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Glenhaven Storm Sewer Relief (P015) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	1	35		12		50
		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**						**70**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Glenhaven Storm Sewer Relief (P015) DATE: 12/16/2022

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= **173**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.52**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Glenbrook Stormwater Storage (P016) DATE: 12/16/2022

PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Glenbrook Stormwater Storage (P016) DATE: 12/16/2022

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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	1	50	1	250
		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	6	6		0		60
		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**						**360**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Glenbrook Stormwater Storage (P016) DATE: 12/16/2022

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	25%	Max points:	1000	250	
	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	**270**	
					TOTAL BENEFIT POINTS	**630**	

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

TOTAL COST IN THOUSANDS= **938**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.67**

Place "X" in one box below:

	MSD Project
	Project by Others

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Clif Side Dr Storm Sewer (P017) DATE: 12/18/2024

		PROBLEM SOLVED CATEGORY 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	
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		

PROJECT NAME: Clif Side Dr Storm Sewer (P017) DATE: 12/18/2024

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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: 431 Clif Side Dr*	250		200	1	50		200
		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**						**200**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Clif Side Dr Storm Sewer (P017) DATE: 12/18/2024

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.)	1	EA		10		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	**230**

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

TOTAL COST IN THOUSANDS= **539**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **0.43**

Place "X" in one box below:

☐ **MSD Project**
☐ **Project by Others**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Glenway Dr Storm Sewer Improvements (P018) DATE: 8/30/2024

PROBLEM SOLVED CATEGORY 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	
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: 955, 1031 and 1047 Glenway Dr*	200		100		15		
		Attached Garage (1 lot per structure) *Address: 808 Glen Elm Dr*	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: 955, 1031, 1032, 1047, 1062, 1088, 1106, 1122, 1138, 1146 Glenway Dr, 808 Glen Elm Dr*	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: Glenway Dr Storm Sewer Improvements (P018) DATE: 8/30/2024

CONTINUED:

		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	
2.0 STORM SEWER / OVERLAND FLOW	2.1. FLOODING	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: 955, 1031 and 1047 Glenway Dr*	250		200	3	50		600
		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: 808 Glen Elm Dr*	100	1	75		25		100
		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: 955, 1031, 1032, 1047, 1062, 1088, 1106, 1122, 1138, 1146 Glenway Dr, 808 Glen Elm Dr*	10	11	6		0		110
		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: Warwick*	10	1	6		1		10
		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**						**870**

MSD Stormwater Projects Prioritization System
Revised Benefit Points Allocation Schedule

PROJECT NAME: Glenway Dr Storm Sewer Improvements (P018) DATE: 8/30/2024

CONTINUED:

SOLUTION BENEFIT CATEGORY							
3.0 REGIONAL	3.1. Reduction of flowrate leaving site	% reduction of peak flowrate :	25%	Max points:	1000	250
	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.)	3	EA	10		30
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		**300**
				TOTAL BENEFIT POINTS		**1170**

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

TOTAL COST IN THOUSANDS= **573**

BENEFIT/ COST RATIO= TOTAL POINTS/ TOTAL COST IN THOUSANDS= **2.04**

Place "X" in one box below:

☐ **MSD Project**
☐ **Project by Others**

APPENDIX G: ARPA FUNDING

In an effort to mitigate adverse stormwater impacts faced by the Residents of Glendale, Missouri, the Stormwater Master Plan identifies improvements totaling approximate $21. 5 M to address critical stormwater infrastructure deficiencies which currently remain unfunded. With a population of only 6,176 people, the City faces ongoing challenges in funding stormwater projects. For this application, the City has selected and reduced the project scope based on priority components to fit within the grant allowance ($5M) to include with this application. The projects were selected and ranked based on a benefit cost analysis which included the number of residents impacted by the project, severity of stormwater impact, availability local matching funds and construction costs.

The City of Glendale occupies approximately 1.3 sq miles and is on the upper reaches of Shady Grove Creek, Rock Hill Creek -Deer Creek Watershed. The drainage areas to this reaches where they traverse the City, fall below the 1sq.mi. threshold for floodplain mapping by the Federal Emergency Management Agency (FEMA). Therefore flood risk information is not currently readily available to homeowners. In addition to ARPA funding, and as a co-permittee of the Metropolitan St. Louis Sewer District, the community is actively exploring alternatives and tools to help identify and reduce the risk from stormwater flooding. Hence, the Stormwater Master plan also includes recommendations for updates to stormwater and floodplain management ordinances as well flood mapping.

CITY OF GLENDALE: MDNR ARPA STORMWATER GRANT PROJECTS OPTION 1*

Revised 6/17/2022

PROJECT ID	PROJECT NAME	BRIEF DESCRIPTION	PROPERTIES BENEFITING	EST. PROJECT COST**
P001	Edwin Ave Underground Detention (From Sappington Rd to S Moreland Ave) (P001)	Install underground detention systems at City Hall and offline stormwater BMP storage cells along Edwin Avenue. Add an inlet on S Moreland Avenue.	8	$ 2,068,029.70
P004	Devon Rd Creek Stabilization (P004)	Construct 30 linear feet of slope stabilization along channel.	1	$ 55,787.60
P005	Idlewild Ln (From Hillard Rd to Dwyer Ave) Storm Sewer Relief (P005)	Replace 220 LF of 24-inch storm sewer with 30-inch storm sewer.	57	$ 114,210.58
P008	W Oak Dr Storm Sewer Relief (P008)	Increase size of 165 linear feet of storm sewer from 36-inch to 42-inch.	53	$ 267,987.62
P009	Alexandra Ave Storm Sewer (From Sappington Road to Glenway Drive) (P009)	Construct 1,000 LF of 24-inch storm sewer and inlets	35	$ 487,885.20
P012	Glenmoor Ave Stormwater Improvements (P012)	Install underground detention, add inlets to intercept flow and upsize 200 linear feet of 27-inch storm sewer to 30-inch storm sewer. Install berms to direct stormwater along the back of houses on the south side of Glenmoore Ave.	21	$ 636,402.80
P013	Madison Ave Storm Sewer Extension (From Monier Pl to N Berry Rd) (P013)	Extend 18 inch storm sewer to the north 25 linear feet and install inlet.	4	$ 71,443.48
P014	Inlet & Curb Replacement (Brownell, Glenvista, Berry Oaks) (P014)	Raise existing inlets and install 45 feet of curb and gutter to direct stormwater.	45	$ 142,589.30
			224	**$ 3,844,336.29**

* *Selection by City based on affordability and largest number of residents benefiting.*

** *Projects cost calculated include Engineers Estimate Of Probable Costs, Adjustment for Easement and Land Acquisition*

Local Cost Share (5%)	$	192,216.81
Add Local Cost Share	$	-
Total Local Cost Share	**$**	**192,216.81**
Grant Funding Requested	$	3,652,119.47